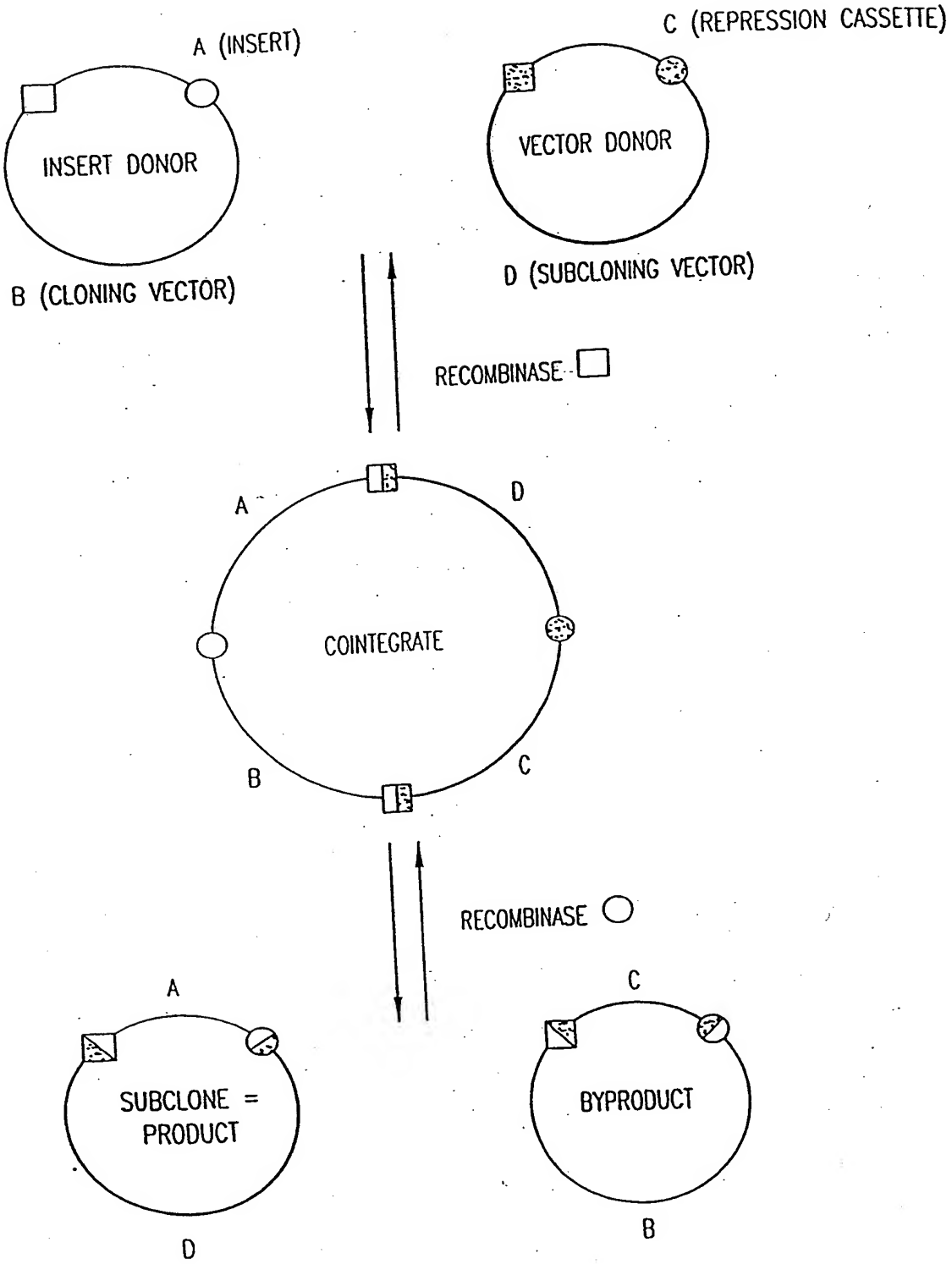


FIG.1

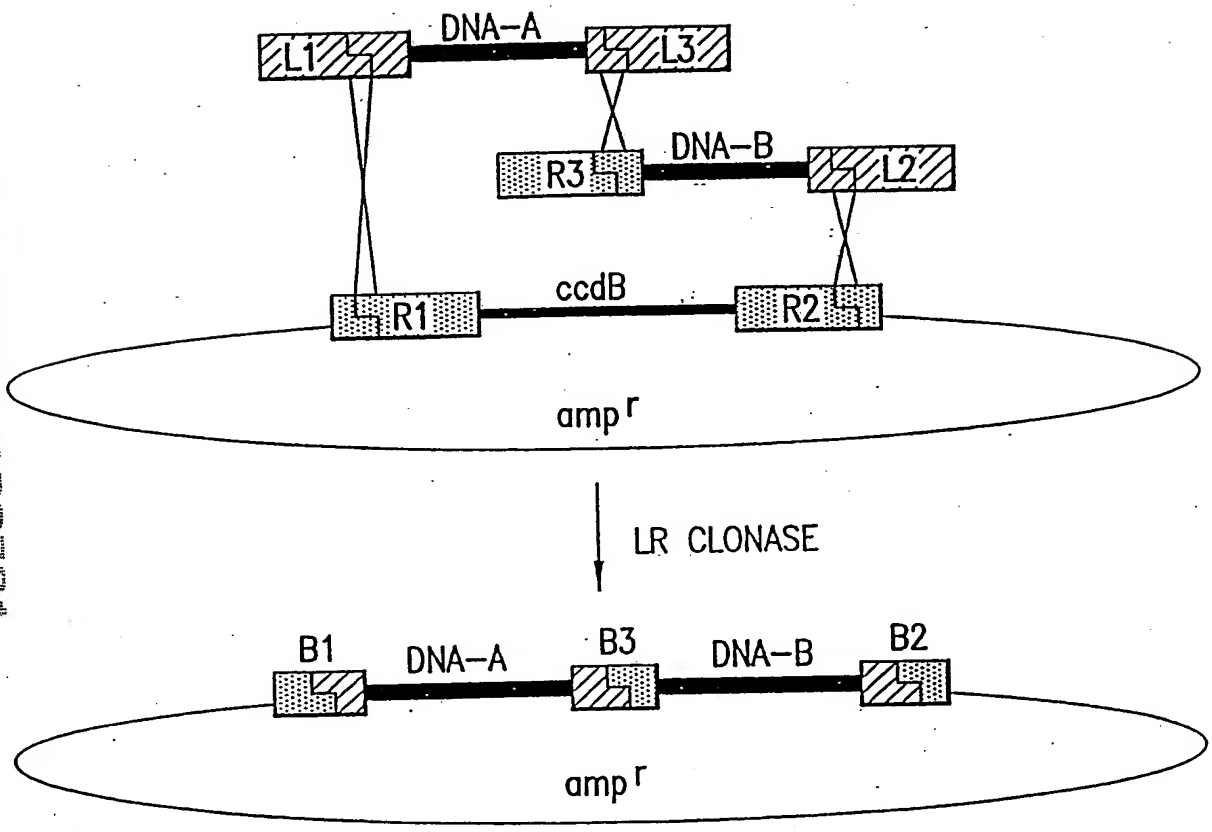

DNA–A
L1
L3
R3
DNA–B
L2
R1
ccdB
R2
amp r
LR CLONASE
B1
DNA–A
B3
DNA–B
B2
amp r

FIG.2

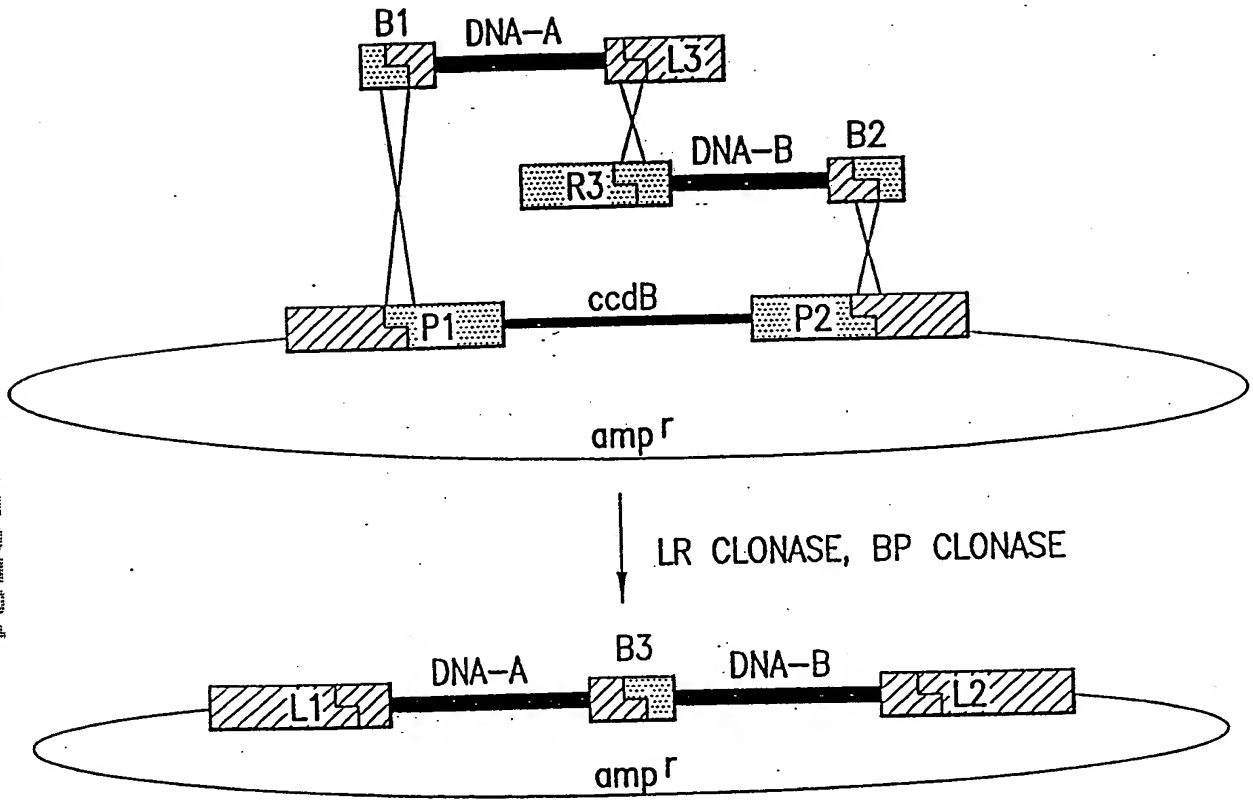

B1
DNA–A
L3
DNA–B
B2
R3
ccdB
P1
P2
amp r
LR CLONASE, BP CLONASE
B3
DNA–A
DNA–B
L1
L2
amp r

FIG.3

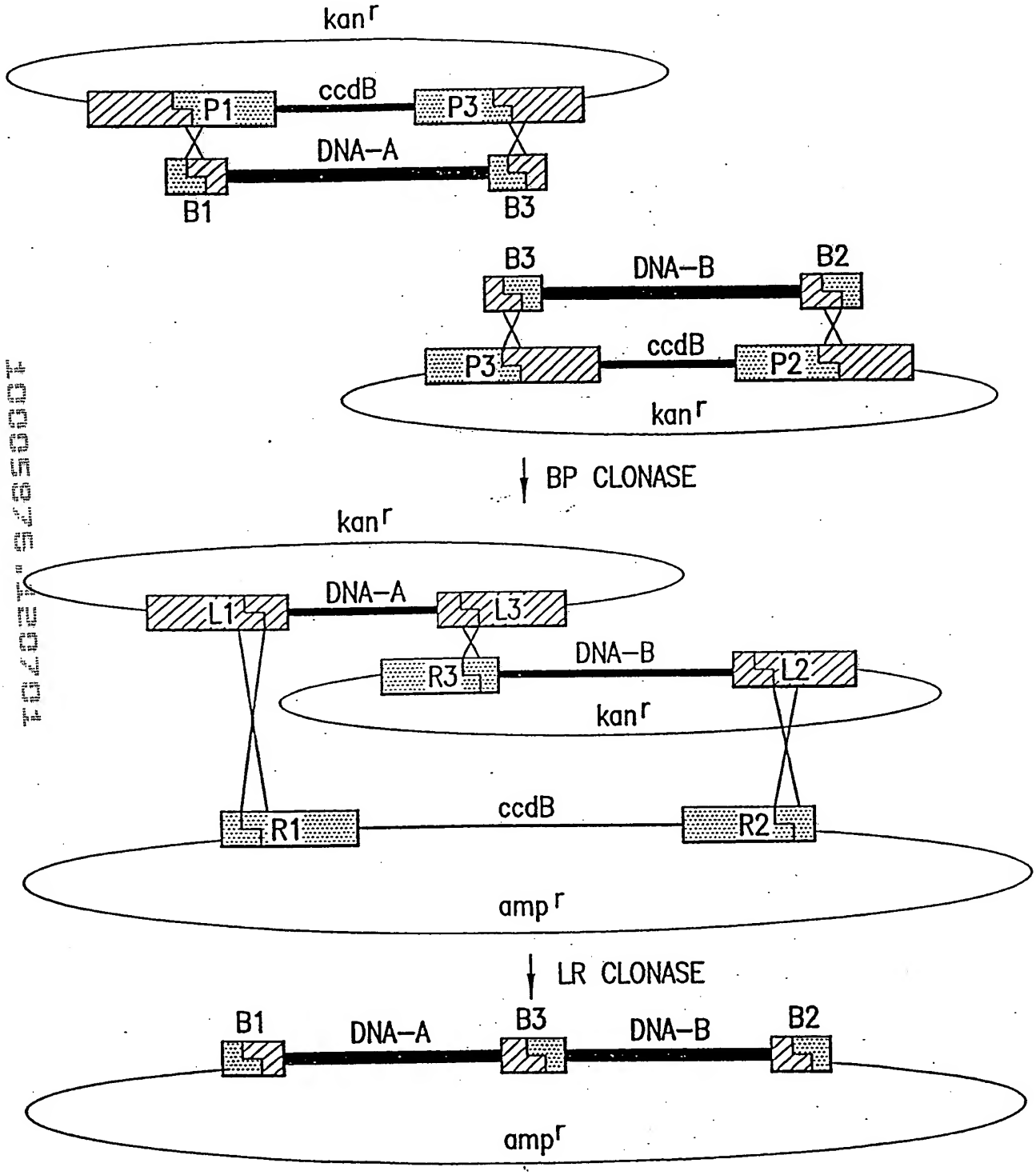

kan r
P1
ccdB
P3
DNA–A
B1
B3
B3
DNA–B
B2
P3
ccdB
P2
kan r
BP CLONASE
kan r
L1
DNA–A
L3
R3
DNA–B
L2
kan r
R1
ccdB
R2
amp r
LR CLONASE
B1
DNA–A
B3
DNA–B
B2
amp r

FIG.4

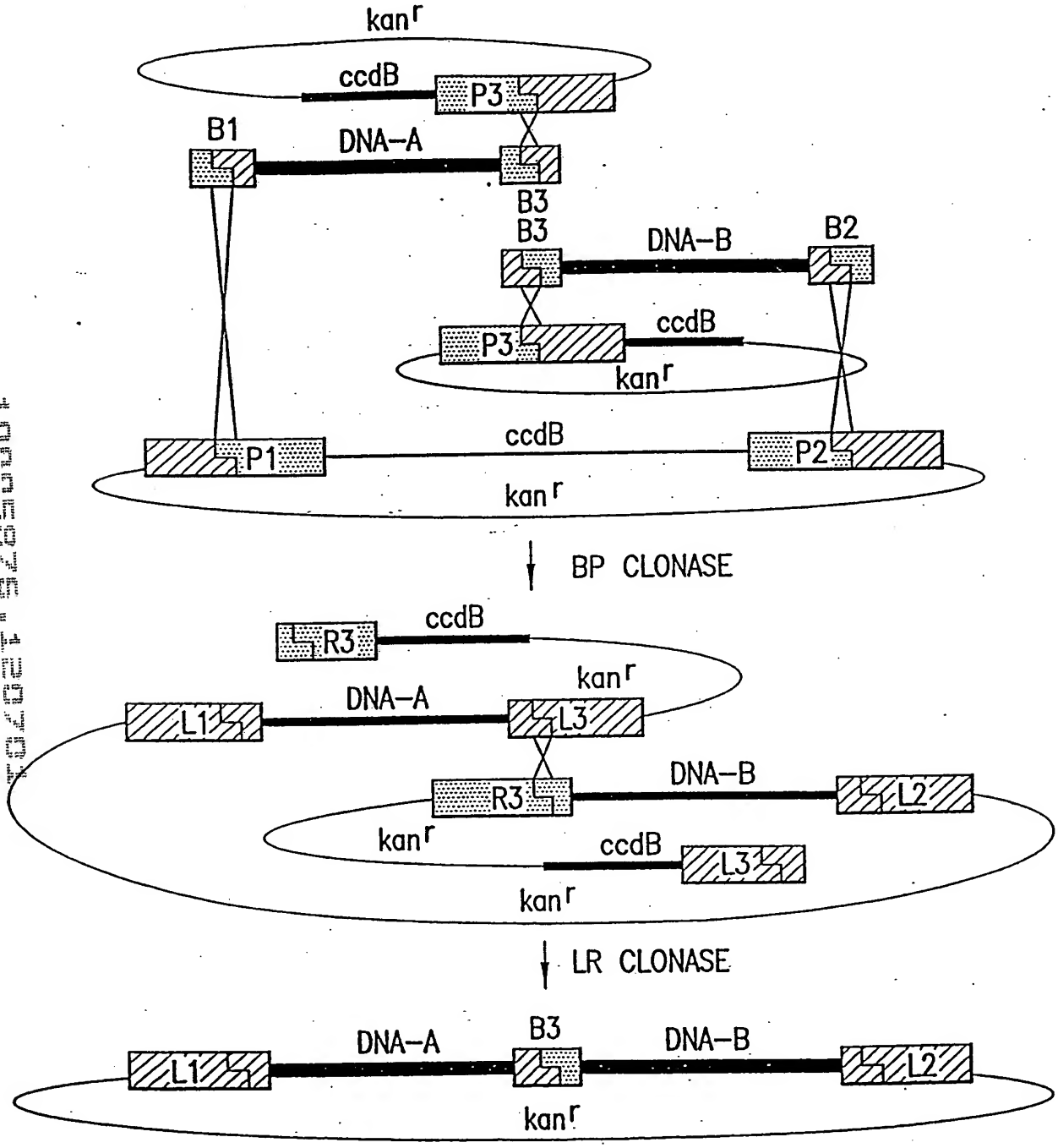

kan r
ccdB
P3
B1
DNA–A
B3
B3
DNA–B
B2
P3
ccdB
kan r
ccdB
P1
P2
kan r
BP CLONASE
ccdB
R3
kan r
DNA–A
L1
L3
DNA–B
R3
L2
kan r
ccdB
L3
kan r
LR CLONASE
DNA–A
B3
DNA–B
L1
L2
kan r

FIG.5

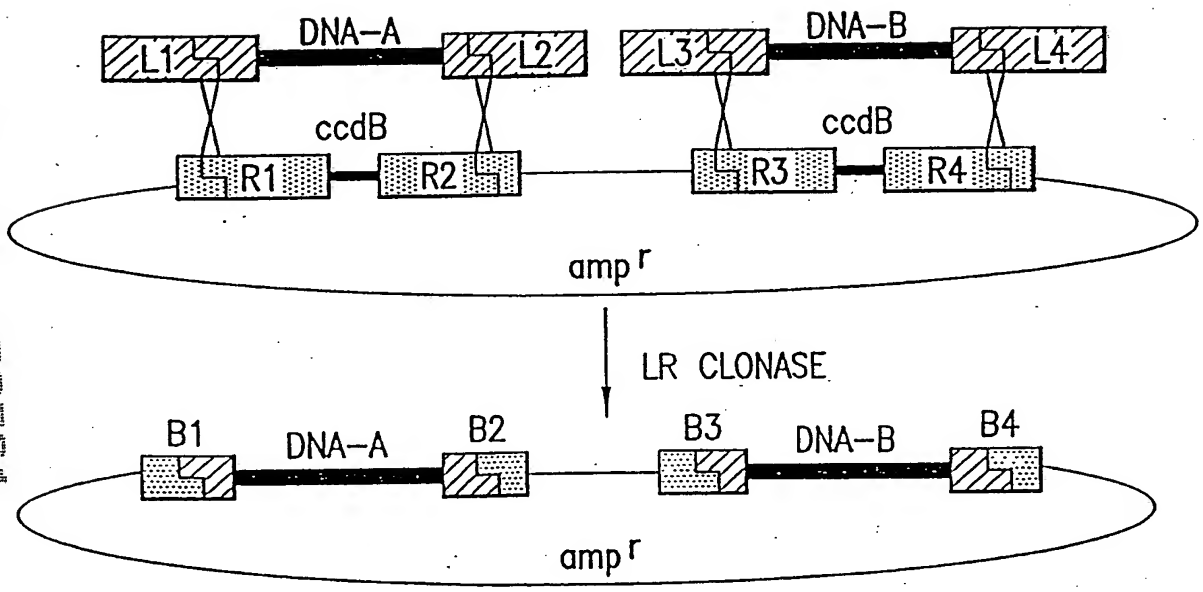

L1
DNA–A
L2
L3
DNA–B
L4
ccdB
ccdB
R1
R2
R3
R4
amp r
LR CLONASE
B1
DNA–A
B2
B3
DNA–B
B4
amp r

FIG.6

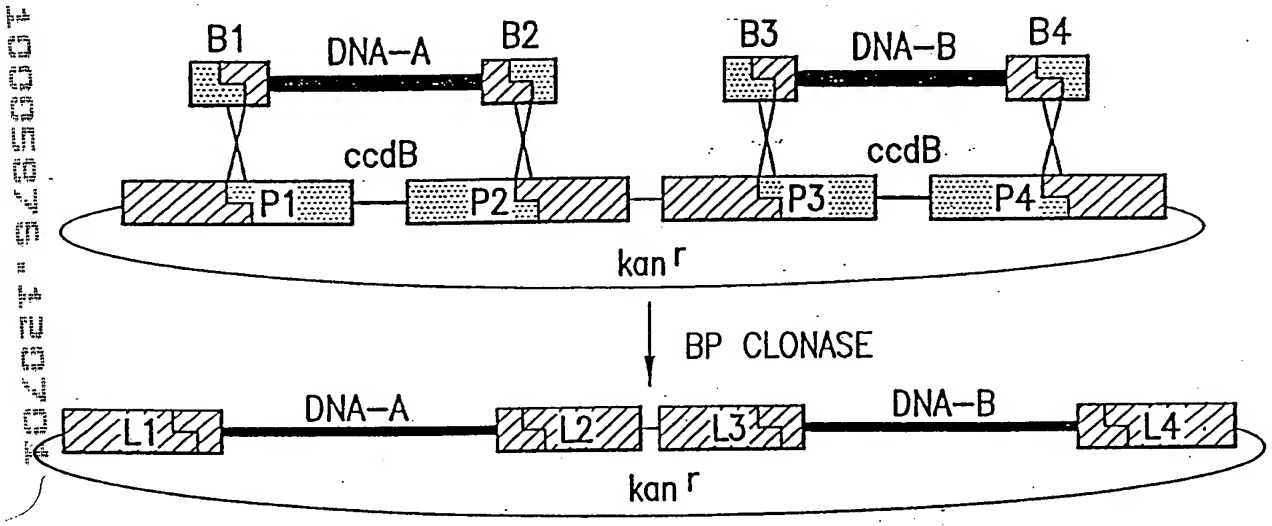

B1
DNA–A
B2
B3
DNA–B
B4
ccdB
ccdB
P1
P2
P3
P4
kan r
BP CLONASE
L1
DNA–A
L2
L3
DNA–B
L4
kan r

FIG.7

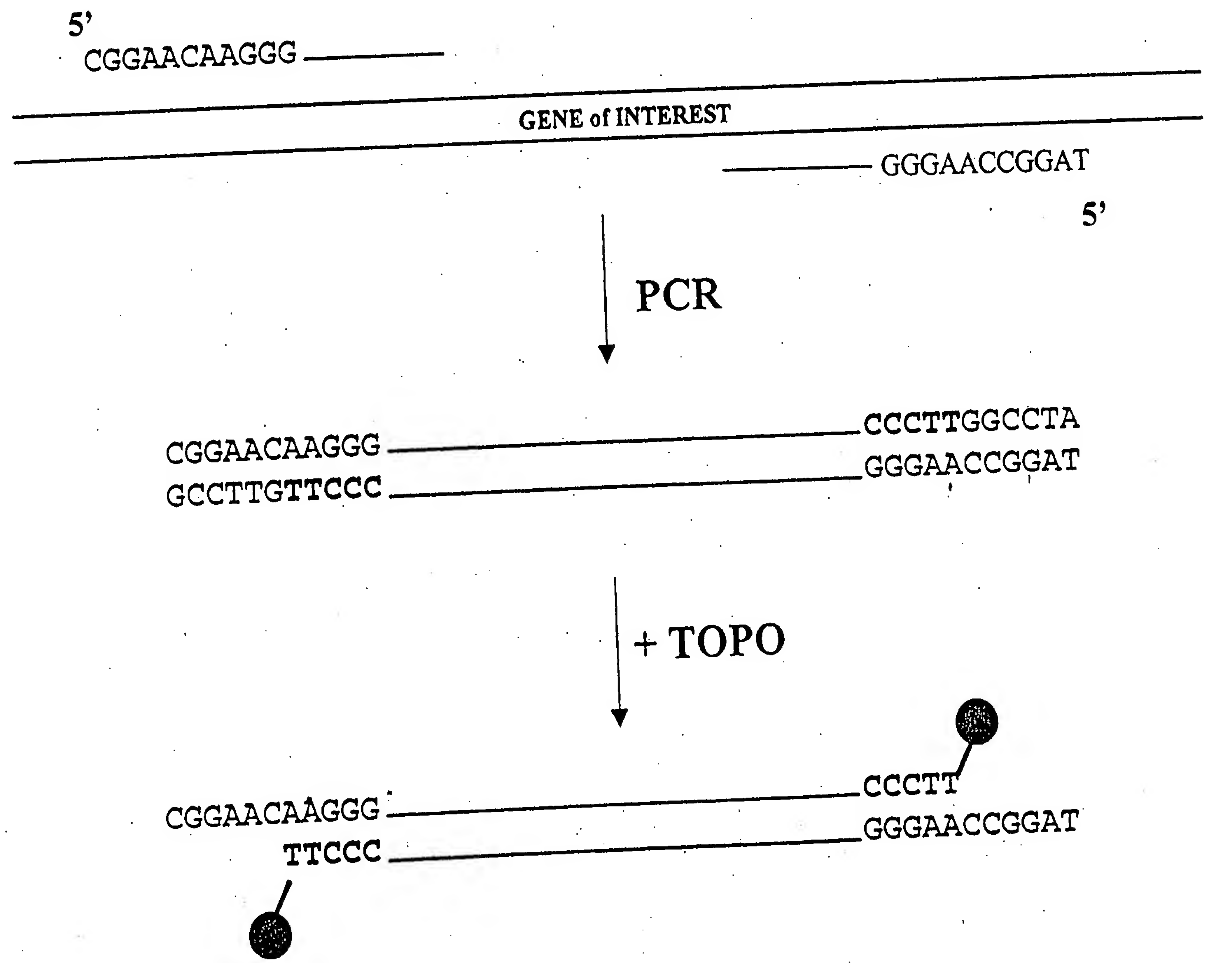

5'
CGGAACAAGGG
GENE of INTEREST
GGGAACCGGAT
5'
PCR
CGGAACAAGGG
GCCTTGTTCCC
CCCTTGGCCTA
GGGAACCGGAT
+ TOPO
CGGAACAAGGG
TTCCC
CCCTT
GGGAACCGGAT

FIGURE 8A

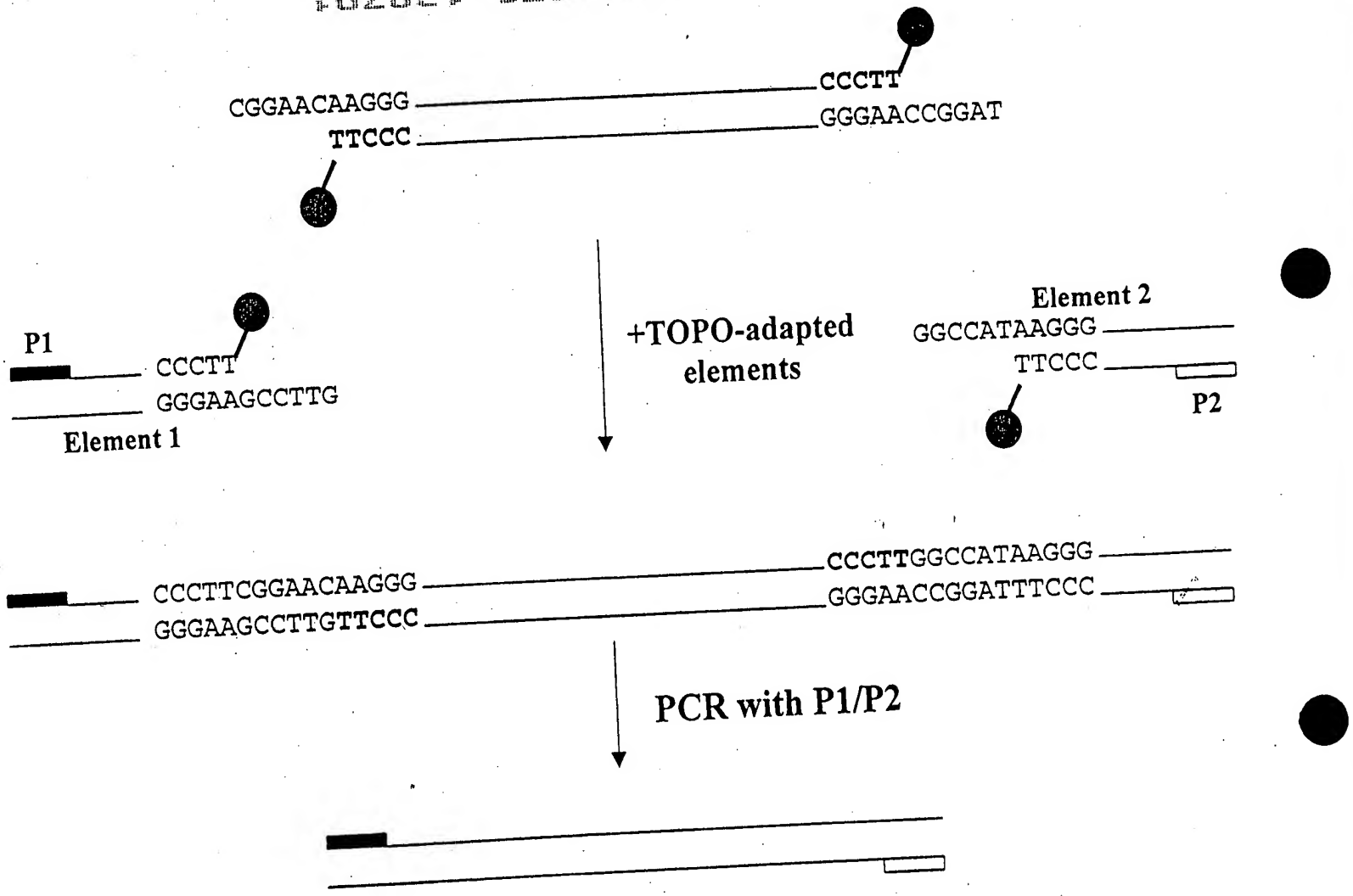


FIGURE 8B

	CMV element	GFP element	BGH element
A:	F6945 ——— CCCTT ——— GGGAA AGCT (29) F7221	(30) TCGAAAGGG ——— F7220 ——— CCCTT TTCCC ——— F6682 ——— GGGAACCGG (31)	(32) GGCCAAGGG ——— F7222 TTCCC ——— F6948
B.	F6945 ——— CCCTT ——— GGGAA GCCTTG (33) F8417	(34) CGGAACAAGGG ——— F8418 ——— CCCTT TTCCC ——— F6682 ——— GGGAACCGG (35)	(36) GGCCAAGGG ——— F7222 TTCCC ——— F6948
C.	F6945 ——— CCCTT ——— GGGAA GCCTTG (37) F8417	(38) CGGAACAAGGG ——— F8418 ——— CCCTT TTCCC ——— F8420 ——— GGGAACCGGAT (39)	(40) GGCCTAAAGGG ——— F8419 TTCCC ——— F6948

FIGURE 9A-C

Table 1

Primer name	F#	Sequence (5' -> 3')	SEQ ID NO:
MTH1	10779	TATGTATCATACACATACGATTTAGGT	1
MTH2	10780	ACCGCCTCTCCCCGCGCGTT	2
GAL4r2	12667	GTTCCGAAGGGGGCGATACAGTCAACTGTCTTTG	3
MTH5	12505	TTGGCCAAGGGTATCTAGAAGCTTCTGCAGACGCGT	4
VP16r2	12668	GTTCCGAAGGGCCACCGTACTCGTCAATTCCAAG	5
SV40pAf	12016	GGCCAAAAGGGAACTTGTTTATTGCAGCTTATAATG	6
SV40pAr	561	CTCTGACTTGAGCGTCGATTTT	7
p53f2	12669	CGGAACAAGGGGAATTCCCTGTCACCGAGACC	8
SVTf2	12670	CGGAACAAGGGGAATTCCCGGGGATCTGGAATTC	9
CMVr2	7221	TCGAAAGGGTCGAGGTCGACCTGCAGCTG	10
CMVf	6945	AATTCACATTGATTATTGAGTAGTTA	11
GFP-Xhof	7220	TCGAAAGGGTAATGGCCAGCAAAGGAGAAG	12
GFP-Notr	6682	GGCCAAGGGTTTGTAGAGCTCATCCAT	13
BGHf2	7222	GGCCAAGGGTCTGAATGGGGCCGCATAGT	14
BGHr	6948	AAGCCATAGAGCCCGGGCCA	15
CMVr3	8417	GTTCCGAAGGGTCGAGGTCGACCTGCAGCTG	16
GFPf3	8418	CGGAACAAGGGATGGCCAGCAAAGGAGAAG	17
GFPr3	8420	TAGGCCAAGGGTTTGTAGAGCTCATCCATGC	18
BGHf3	8419	GGCCTAAAGGGTGAATGGGGCCGCATAGT	19
T7top	9304	GAAGGAGTAATACGACTCACTATAGGGAGCCACCATGGGCCCTTCGGAAC	20
T7bottom	9305	GTTCCGAAGGGCCCATGGTGGCTCCCTATAGTGAGTCGTATTACTCCTTC	21
T7amp	9306	GAAGGAGTAATACGACTCACT	22
T3top	9661	GGCCTAAAGGGTCCCTTTAGTGAGGGTTAATTGCGCGC	23
T3bottom	9662	GCGCGCAATTAACCCTCACTAAAGGGACCCTTTAGGCC	24
lacZf2	10632	CGGAACAAGGGATGATAGATCCCGTCGTTTTACA	25
lacZ1k2	10770	TAGGCCAAGGGGACCATTTTCAATCCGCACCT	26
lacZ2k2	10771	TAGGCCAAGGGGAGGCACTTCACCGCTTGCCA	27
lacZ3k2	10772	TAGGCCAAGGGTTTGACACCAGACCAACTGGTA	28

FIGURE 9D

A.

Sample #	GAL4+pA	VP16+pA	pGene/lacZ	GAL4+p53+pA	VP16+T+pA	p53-VP16
1			0.26 ug	p 0.37 ug	p 0.37 ug	
2			0.4 ug	p 0.3 ug	p 0.3 ug	
3			0.4 ug			p 0.6 ug
4			0.4 ug	I 0.3 ug	I 0.3 ug	
5		I 0.3 ug	0.4 ug	I 0.3 ug		
6	I 0.3 ug		0.4 ug		I 0.3 ug	
7			0.4 ug	4.5 ul PCR	4.5 ul PCR	
8		4.5 ul PCR	0.4 ug	4.5 ul PCR		
9	4.5 ul PCR		0.4 ug		4.5 ul PCR	

B.

Sample #	LacZ activi
1	240000
2	140000
3	1800000
4	1400000
5	54000
6	80000
7	320000
8	12000
9	42000

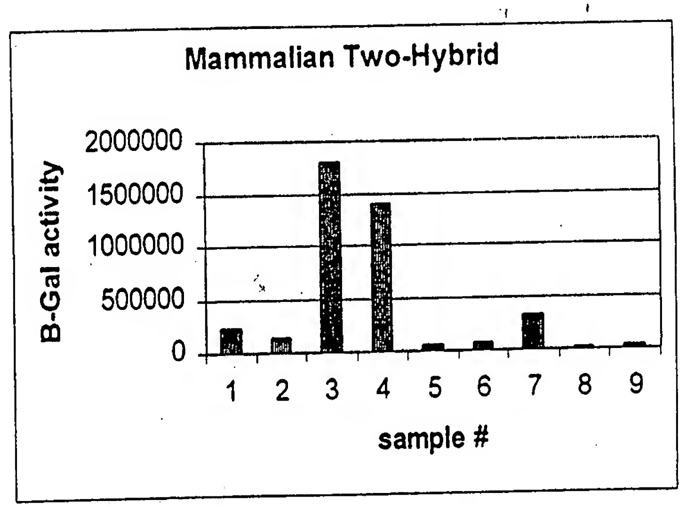


FIGURE 10

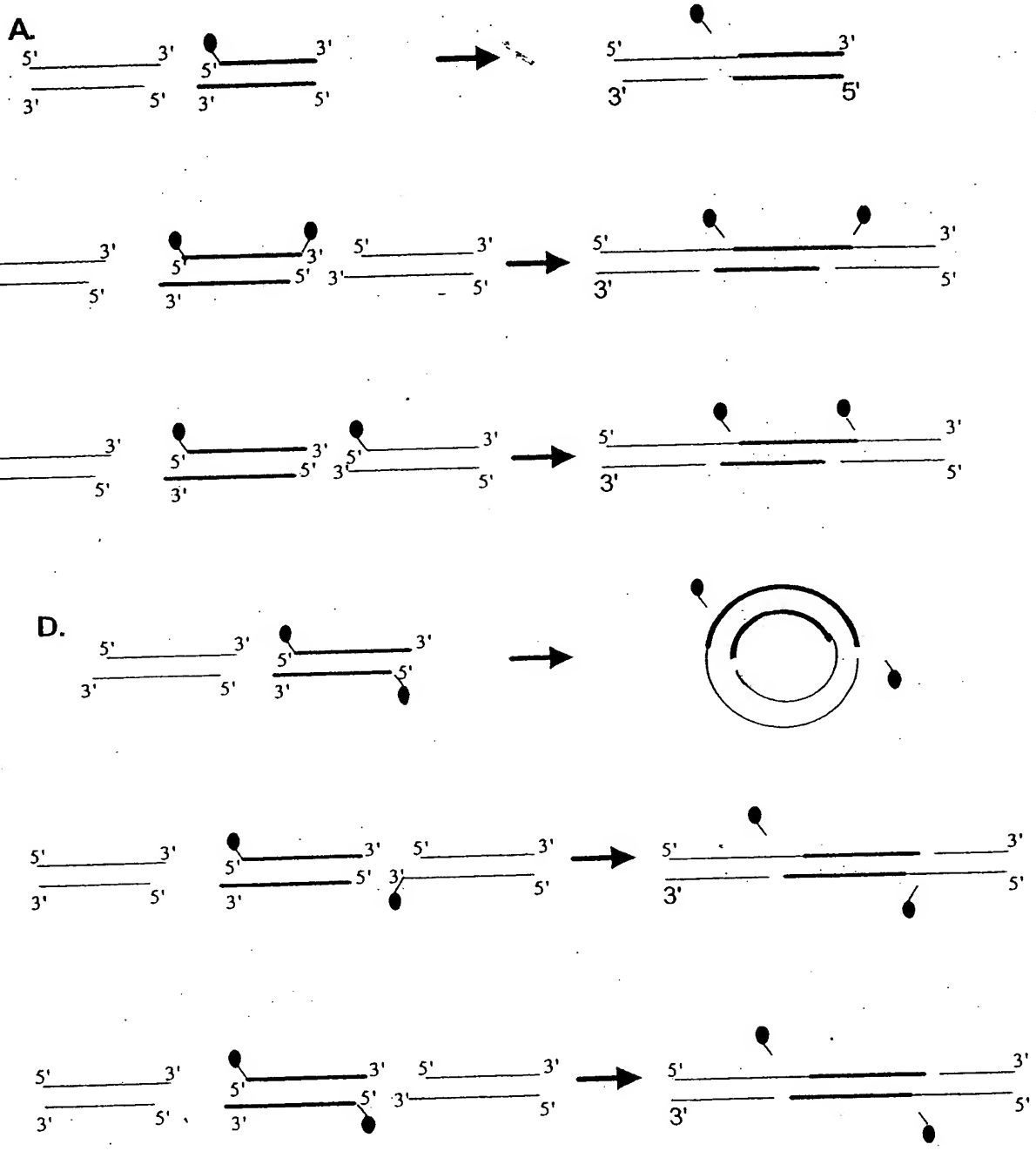


FIGURE 11

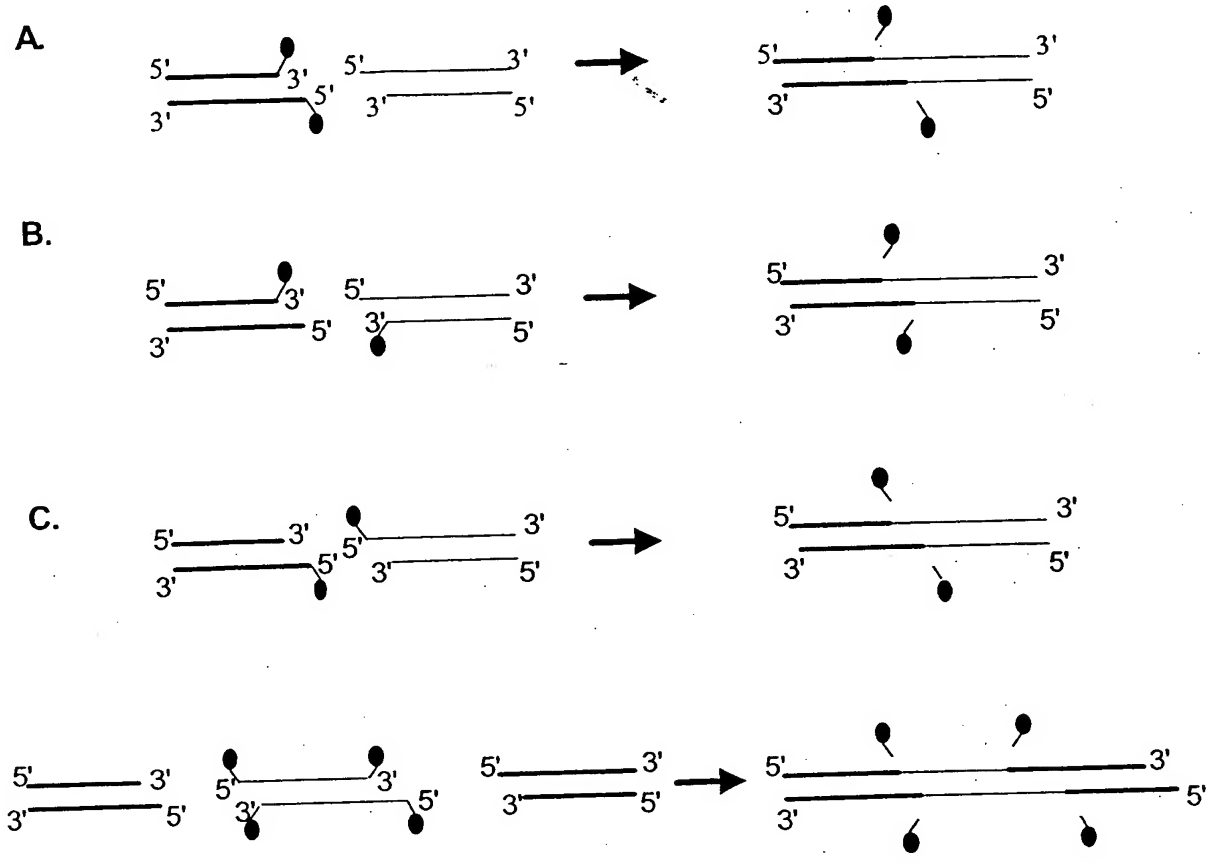

A.
5'
3'
5'
3'
3'
5'
5'
3'
3'
5'
B.
5'
3'
3'
5'
5'
3'
3'
5'
5'
3'
3'
5'
C.
5'
3'
3'
5'
5'
3'
3'
5'
5'
3'
3'
5'
D.
5'
3'
3'
5'
5'
3'
3'
5'
5'
3'
3'
5'
5'
3'
3'
5'

FIGURE 12

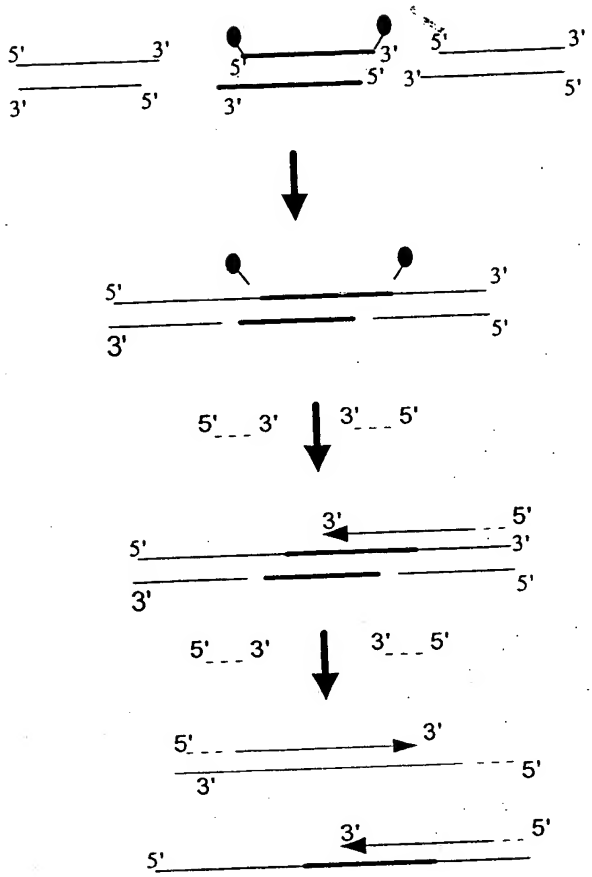


FIGURE 13

FIGURE 14

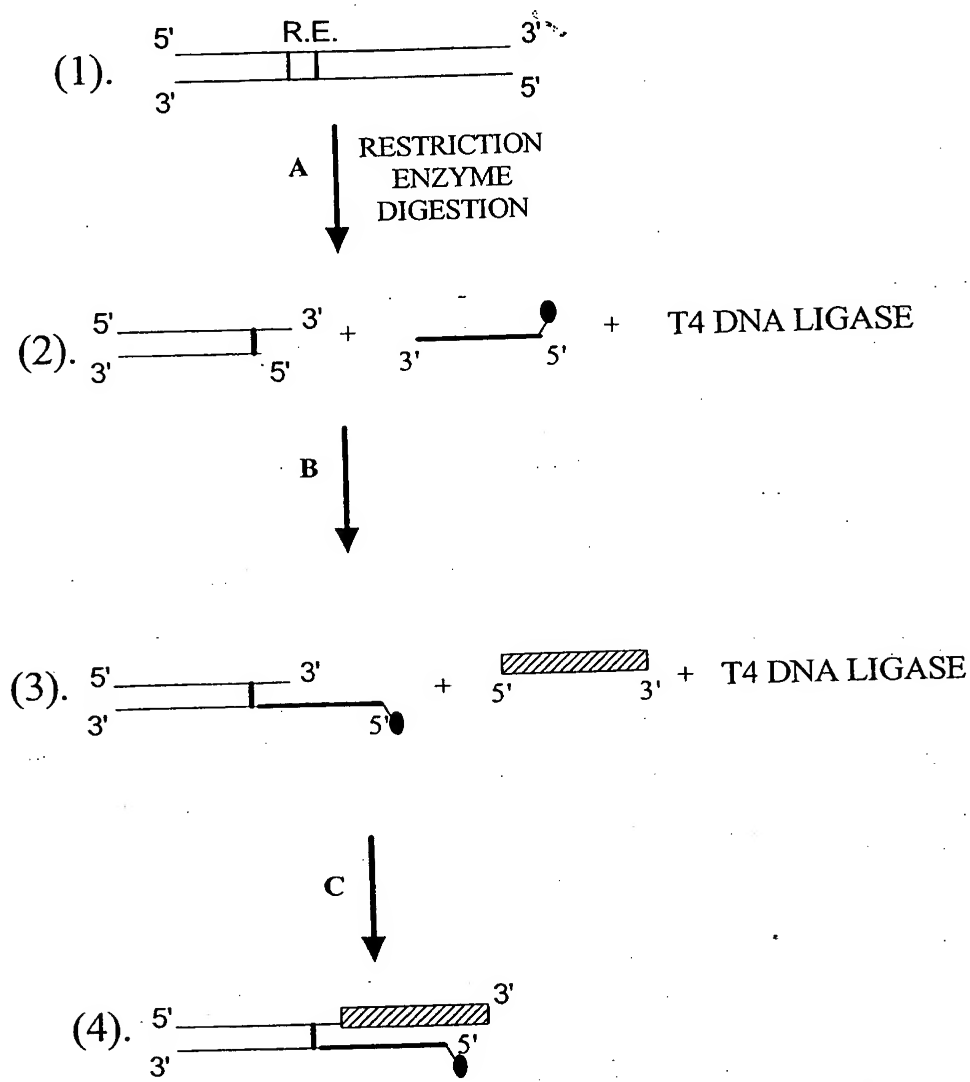
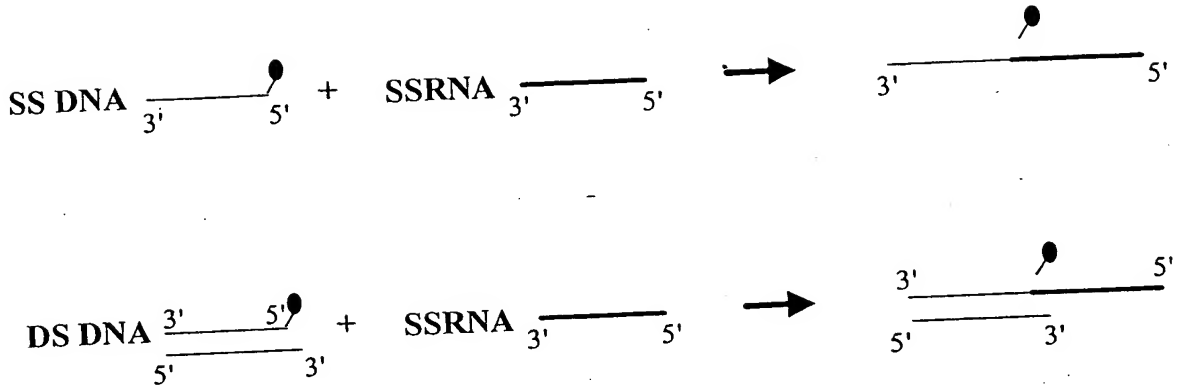


FIGURE 15



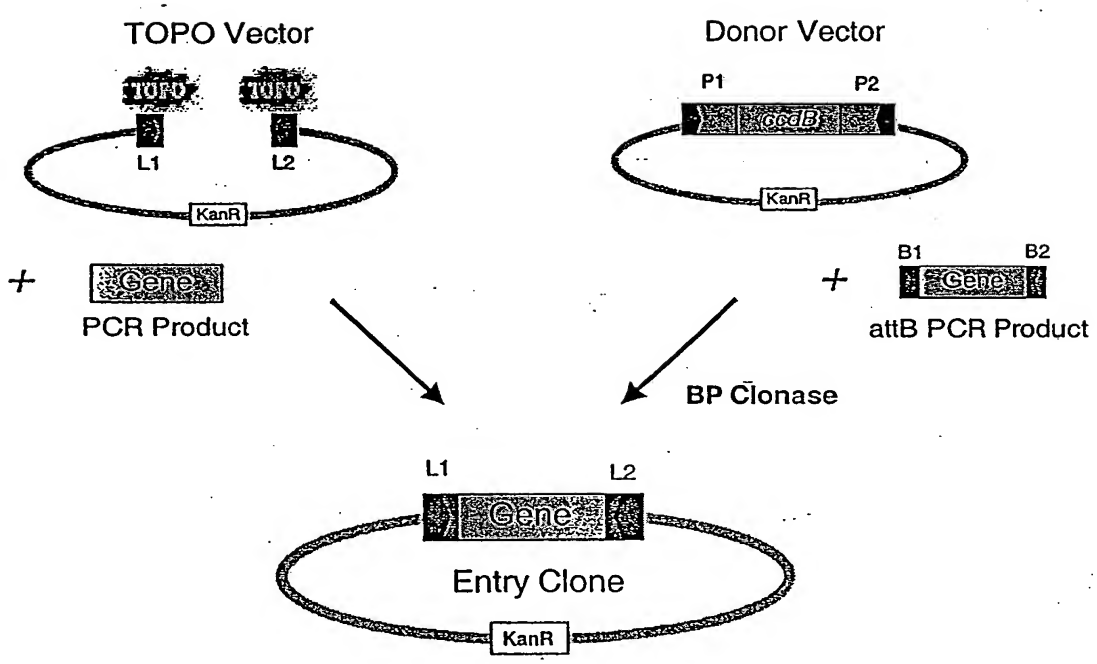

TOPO Vector
TOPO
TOPO
L1
L2
KanR
Donor Vector
P1
P2
ccdB
KanR
+
Gene
PCR Product
+
B1
B2
Gene
attB PCR Product
BP Clonase
L1
L2
Gene
Entry Clone
KanR

FIGURE 16

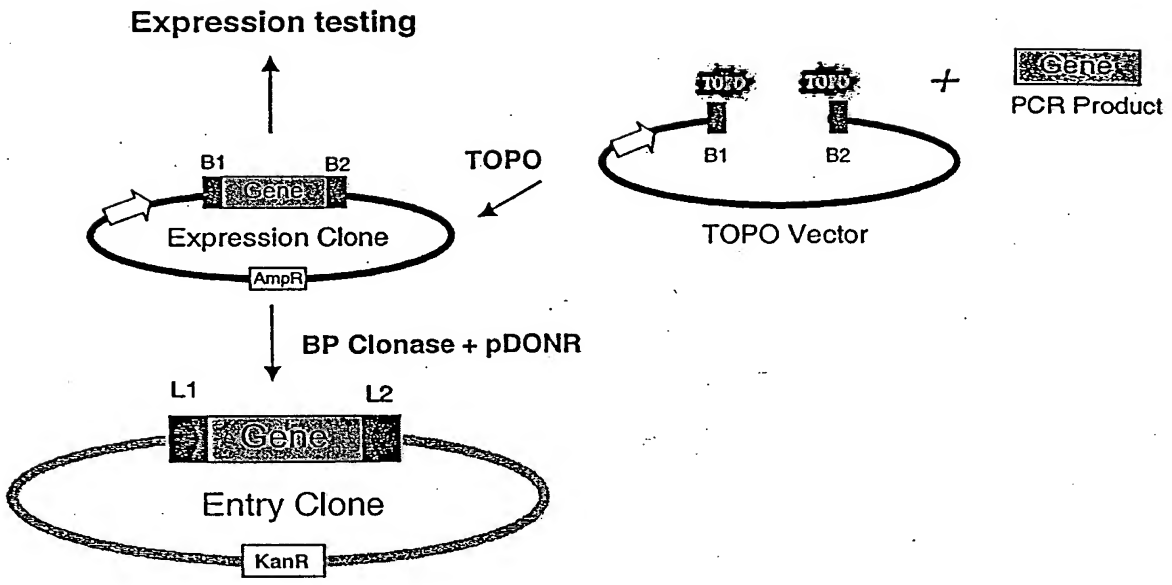

Expression testing
B1
B2
Gene
Expression Clone
AmpR
TOPO
TOPO
TOPO
B1
B2
TOPO Vector
+
Gene
PCR Product
BP Clonase + pDONR
L1
L2
Gene
Entry Clone
KanR

FIGURE 17

MCS for pcDNAGW-DT(sc) and pENTR-DT(sc)

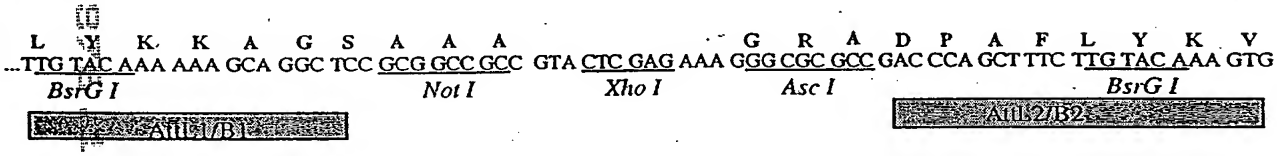


FIGURE 18

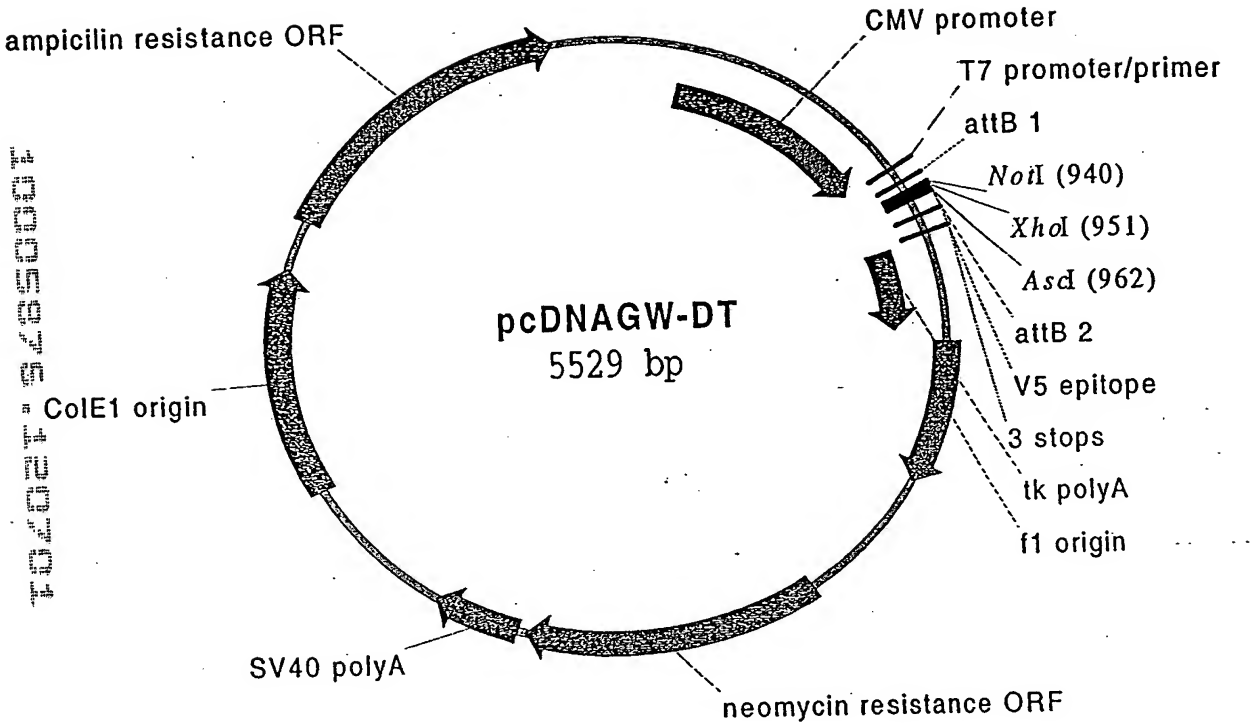

ampicilin resistance ORF
CMV promoter
T7 promoter/primer
attB 1
NotI (940)
XhoI (951)
AscI (962)
attB 2
V5 epitope
3 stops
tk polyA
f1 origin
pcDNAGW-DT
5529 bp
ColE1 origin
SV40 polyA
neomycin resistance ORF

FIGURE 19

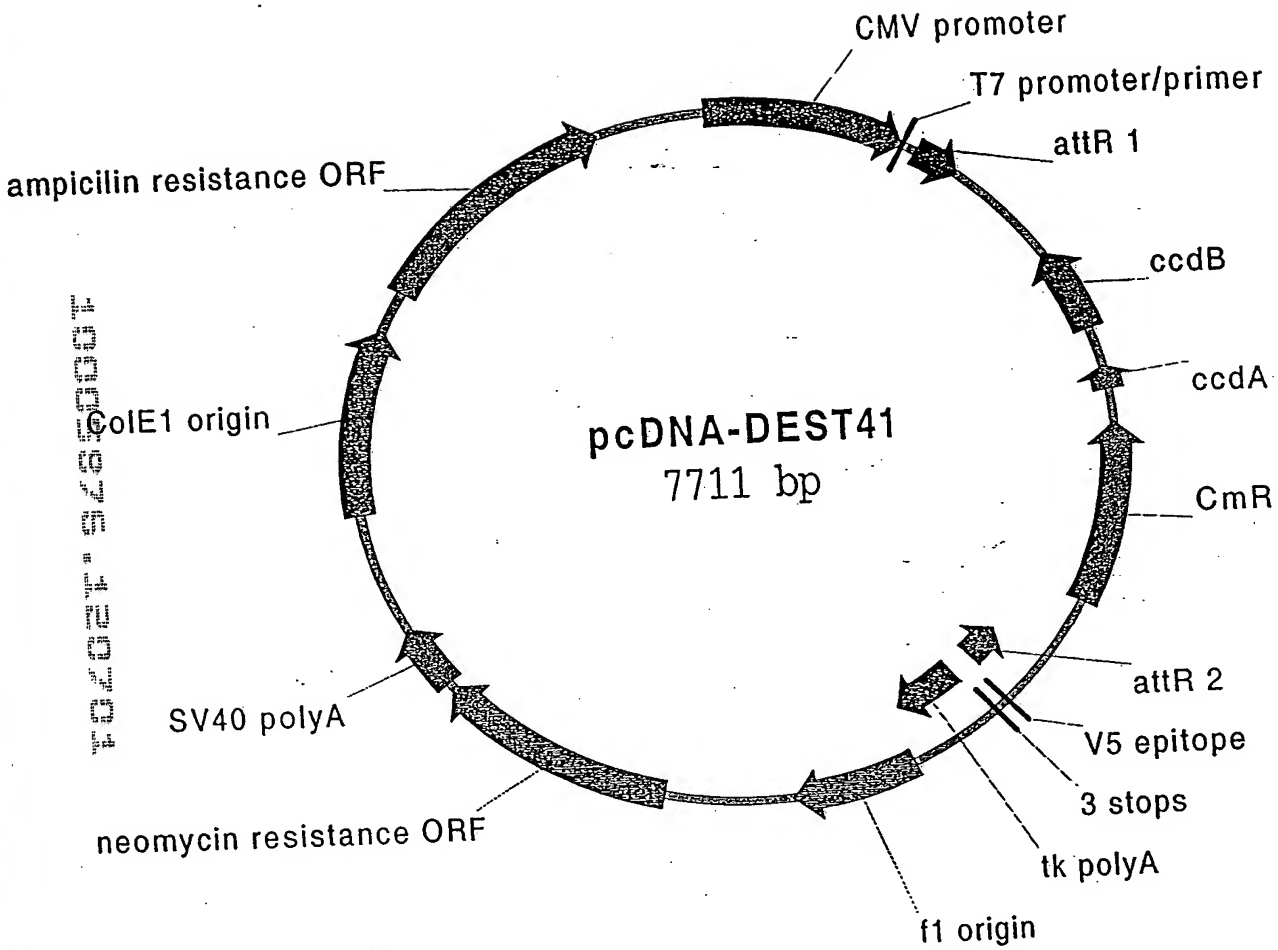

CMV promoter
T7 promoter/primer
attR 1
ccdB
ccdA
CmR
attR 2
V5 epitope
3 stops
tk polyA
f1 origin
neomycin resistance ORF
SV40 polyA
ColE1 origin
ampicilin resistance ORF
pcDNA-DEST41
7711 bp

FIGURE 20

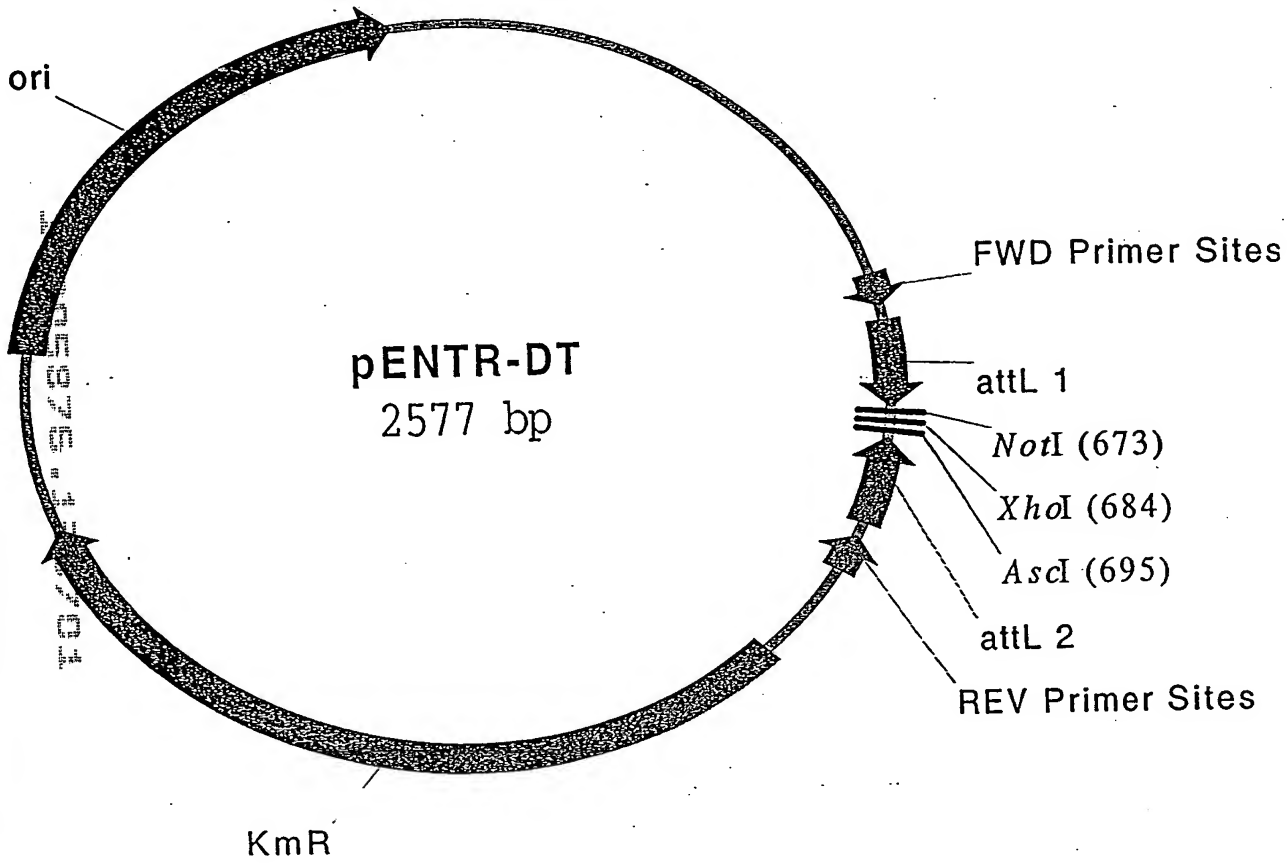

ori
pENTR-DT
2577 bp
FWD Primer Sites
attL 1
NotI (673)
XhoI (684)
AscI (695)
attL 2
REV Primer Sites
KmR

FIGURE 21

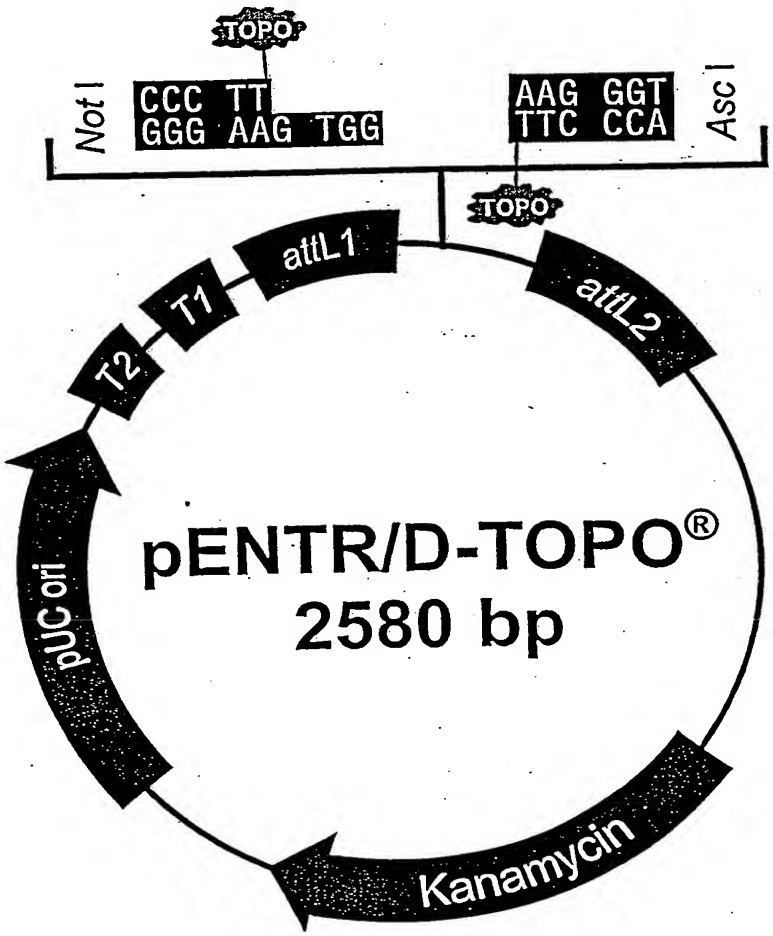

TOPO
Not I
CCC TT
GGG AAG TGG
AAG GGT
TTC CCA
Asc I
TOPO
attL1
attL2
T2
T1
pUC ori
pENTR/D-TOPO®
2580 bp
Kanamycin

FIGURE 22A

```
   1 ctttcctgcg ttatcccctg attctgtgga taaccgtatt accgcctttg agtgagctga
  61 taccgctcgc cgcagccgaa cgaccgagcg cagcgagtca gtgagcgagg aagcggaaga
 121 gcgcccaata cgcaaaccgc ctctccccgc gcgttggccg attcattaat gcagctggca
 181 cgacaggttt cccgactgga aagcgggcag tgagcgcaac gcaattaata cgcgtaccgc
 241 tagccaggaa gagtttgtag aaacgcaaaa aggccatccg tcaggatggc cttctgctta
 301 gtttgatgcc tggcagttta tggcgggcgt cctgcccgcc accctccggg ccgttgcttc
 361 acaacgttca aatccgctcc cggcggattt gtcctactca ggagagcgtt caccgacaaa
 421 caacagataa aacgaaaggc ccagtcttcc gactgagcct ttcgttttat ttgatgcctg
 481 gcagttccct actctcgcgt taacgctagc atggatgttt tcccagtcac gacgttgtaa
 541 aacgacggcc agtcttaagc tcgggcccca aataatgatt ttattttgac tgatagtgac
 601 ctgttcgttg caacaaattg atgagcaatg ctttttttata atgccaactt tgtacaaaaa
 661 agcaggctcc gcggccgccc cttcaccatg nnnnnnnnna agggtgggcg cgccgaccca
 721 gctttcttgt acaaagttgg cattataaga aagcattgct tatcaatttg ttgcaacgaa
 781 caggtcacta tcagtcaaaa taaaatcatt atttgccatc cagctgatat cccctatagt
 841 gagtcgtatt acatggtcat agctgtttcc tggcagctct ggcccgtgtc tcaaaatctc
 901 tgatgttaca ttgcacaaga taaaaatata tcatcatgaa caataaaact gtctgcttac
 961 ataaacagta atacaagggg tgttatgagc catattcaac gggaaacgtc gaggccgcga
1021 ttaaattcca acatggatgc tgatttatat gggtataaat gggctcgcga taatgtcggg
1081 caatcaggtg cgacaatcta tcgcttgtat gggaagcccg atgcgccaga gttgtttctg
1141 aaacatggca aaggtagcgt tgccaatgat gttacagatg agatggtcag actaaactgg
1201 ctgacggaat ttatgcctct tccgaccatc aagcatttta tccgtactcc tgatgatgca
1261 tggttactca ccactgcgat ccccggaaaa acagcattcc aggtattaga agaatatcct
1321 gattcaggtg aaaatattgt tgatgcgctg gcagtgttcc tgcgccggtt gcattcgatt
1381 cctgtttgta attgtccttt taacagcgat cgcgtatttc gtctcgctca ggcgcaatca
1441 cgaatgaata acggtttggt tgatgcgagt gattttgatg acgagcgtaa tggctggcct
1501 gttgaacaag tctggaaaga aatgcataaa cttttgccat tctcaccgga ttcagtcgtc
1561 actcatggtg atttctcact tgataacctt atttttgacg aggggaaatt aataggttgt
1621 attgatgttg gacgagtcgg aatcgcagac cgataccagg atcttgccat cctatggaac
1681 tgcctcggtg agttttctcc ttcattacag aaacggcttt ttcaaaaata tggtattgat
1741 aatcctgata tgaataaatt gcagtttcat ttgatgctcg atgagttttt ctaatcagaa
1801 ttggttaatt ggttgtaaca ctggcagagc attacgctga cttgacggga cggcgcaagc
1861 tcatgaccaa aatcccttaa cgtgagttac gcgtcgttcc actgagcgtc agaccccgta
1921 gaaaagatca aaggatcttc ttgagatcct ttttttctgc gcgtaatctg ctgcttgcaa
1981 acaaaaaaac caccgctacc agcggtggtt tgtttgccgg atcaagagct accaactctt
2041 tttccgaagg taactggctt cagcagagcg cagataccaa atactgtcct tctagtgtag
2101 ccgtagttag gccaccactt caagaactct gtagcaccgc ctacatacct cgctctgcta
2161 atcctgttac cagtggctgc tgccagtggc gataagtcgt gtcttaccgg gttggactca
2221 agacgatagt taccggataa ggcgcagcgg tcgggctgaa cgggggttc gtgcacacag
2281 cccagcttgg agcgaacgac ctacaccgaa ctgagatacc tacagcgtga gcattgagaa
2341 agcgccacgc ttcccgaagg gagaaaggcg gacaggtatc cggtaagcgg cagggtcgga
2401 acaggagagc gcacgaggga gcttccaggg ggaaacgcct ggtatcttta tagtcctgtc
2461 gggtttcgcc acctctgact tgagcgtcga tttttgtgat gctcgtcagg ggggcggagc
2521 ctatggaaaa acgccagcaa cgcggccttt ttacggttcc tggccttttg ctggcctttt
2581 gctcacatgt t
```

FIGURE 22B

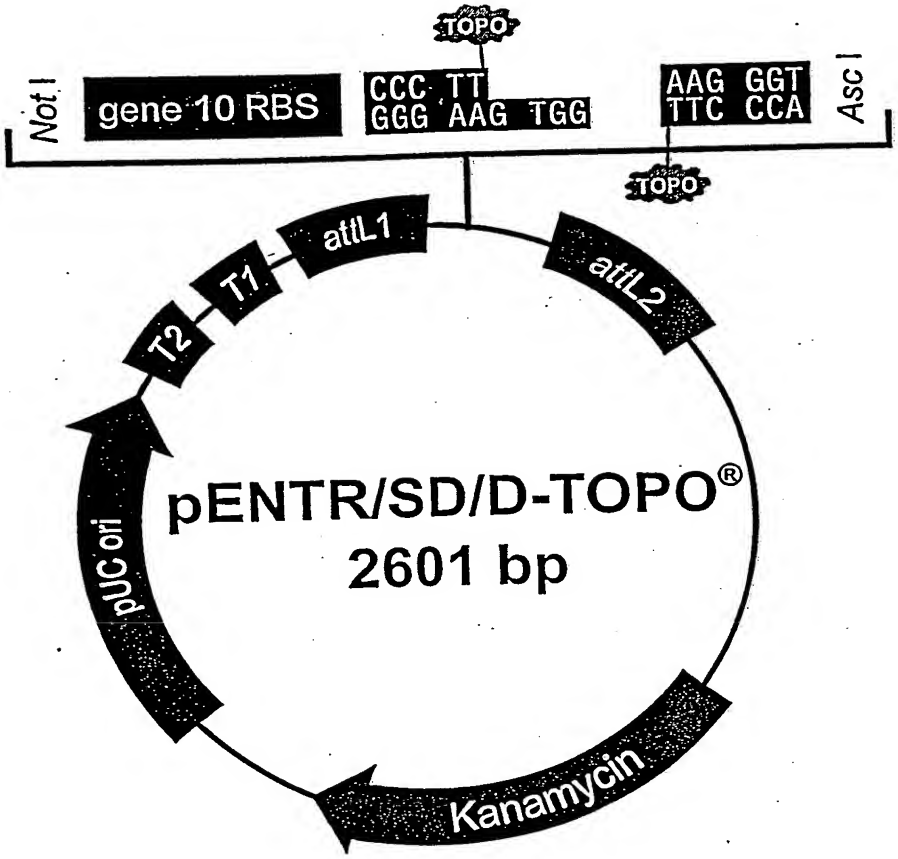

TOPO
Not I
gene 10 RBS
CCC TT
GGG AAG TGG
AAG GGT
TTC CCA
Asc I
TOPO
attL1
attL2
T1
T2
pENTR/SD/D-TOPO®
2601 bp
pUC ori
Kanamycin

FIGURE 23A

```
   1 ctttcctgcg ttatcccctg attctgtgga taaccgtatt accgcctttg agtgagctga
  61 taccgctcgc cgcagccgaa cgaccgagcg cagcgagtca gtgagcgagg aagcggaaga
 121 gcgcccaata cgcaaaccgc ctctccccgc gcgttggccg attcattaat gcagctggca
 181 cgacaggttt cccgactgga aagcgggcag tgagcgcaac gcaattaata cgcgtaccgc
 241 tagccaggaa gagtttgtag aaacgcaaaa aggccatccg tcaggatggc cttctgctta
 301 gtttgatgcc tggcagttta tggcgggcgt cctgcccgcc accctccggg ccgttgcttc
 361 acaacgttca aatccgctcc cggcggattt gtcctactca ggagagcgtt caccgacaaa
 421 caacagataa aacgaaaggc ccagtcttcc gactgagcct ttcgttttat ttgatgcctg
 481 gcagttccct actctcgcgt taacgctagc atggatgttt tcccagtcac gacgttgtaa
 541 aacgacggcc agtcttaagc tcgggcccca aataatgatt ttattttgac tgatagtgac
 601 ctgttcgttg caacaaattg atgagcaatg ctttttttata atgccaactt tgtacaaaaa
 661 agcaggctcc gcggccgcct tgtttaactt taagaaggag cccttcaccn nnnnnaaggg
 721 tgggcgcgcc gacccagctt tcttgtacaa agttggcatt ataagaaagc attgcttatc
 781 aatttgttgc aacgaacagg tcactatcag tcaaaataaa atcattattt gccatccagc
 841 tgatatcccc tatagtgagt cgtattacat ggtcatagct gtttcctggc agctctggcc
 901 cgtgtctcaa aatctctgat gttacattgc acaagataaa aatatatcat catgaacaat
 961 aaaactgtct gcttacataa acagtaatac aaggggtgtt atgagccata ttcaacggga
1021 aacgtcgagg ccgcgattaa attccaacat ggatgctgat ttatatgggt ataaatgggc
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2461 tctttatagt cctgtcgggt ttcgccacct ctgacttgag cgtcgatttt tgtgatgctc
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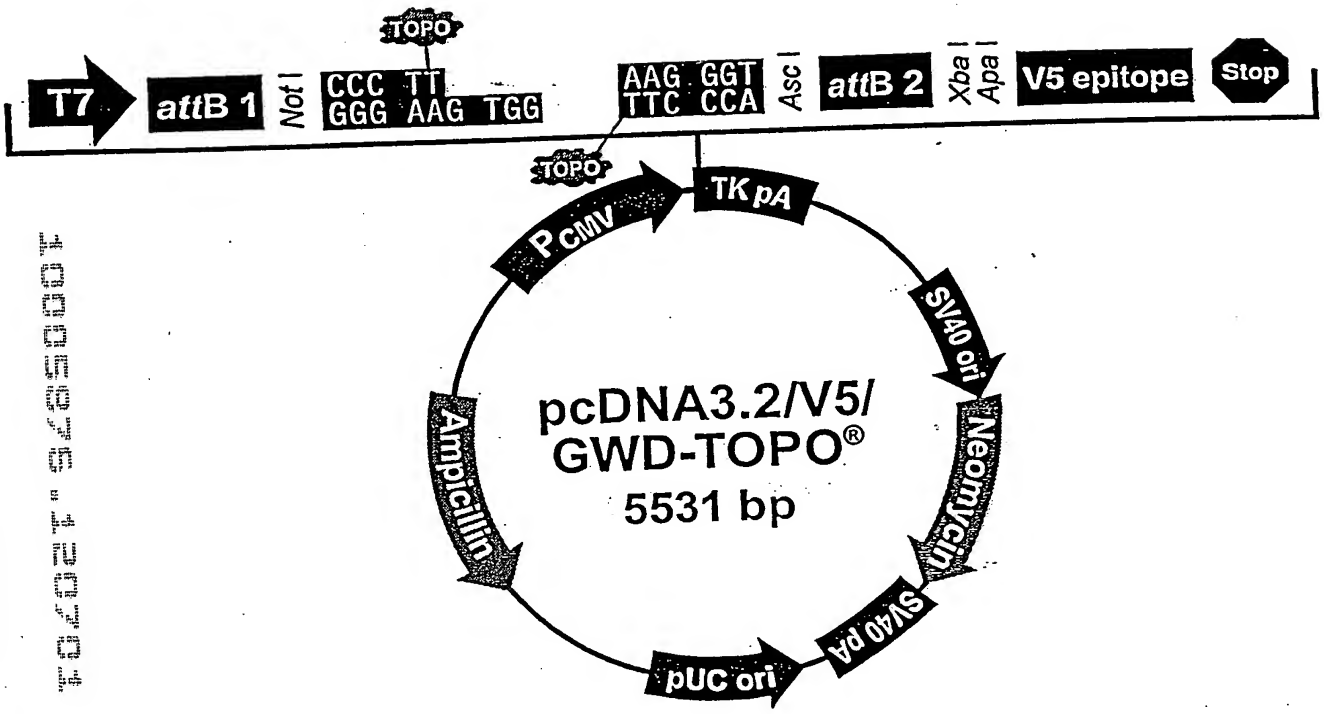
FIGURE 23B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attB 1
Not I
CCC TT
GGG AAG TGG
AAG GGT
TTC CCA
Asc I
attB 2
Xba I
Apa I
V5 epitope
Stop
TOPO
P CMV
TK pA
SV40 ori
Neomycin
SV40 pA
pUC ori
Ampicillin
pcDNA3.2/V5/
GWD-TOPO®
5531 bp

FIGURE 24A

```
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  61 ccgcatagtt aagccagtat ctgctccctg cttgtgtgtt ggaggtcgct gagtagtgcg
 121 cgagcaaaat ttaagctaca acaaggcaag gcttgaccga caattgcatg aagaatctgc
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 361 cccgcccatt gacgtcaata atgacgtatg ttcccatagt aacgccaata gggactttcc
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 601 tcgctattac catggtgatg cggttttggc agtacatcaa tgggcgtgga tagcggtttg
 661 actcacgggg atttccaagt ctccacccca ttgacgtcaa tgggagtttg ttttggcacc
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 781 gtaggcgtgt acggtgggag gtctatataa gcagagctct ctggctaact agagaaccca
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```

FIGURE 24B

```
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3301 ctagttgtgg tttgtccaaa ctcatcaatg tatcttatca tgtctgtata ccgtcgacct
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3601 ggcgctcttc cgcttcctcg ctcactgact cgctgcgctc ggtcgttcgg ctgcggcgag
3661 cggtatcagc tcactcaaag gcggtaatac ggttatccac agaatcaggg gataacgcag
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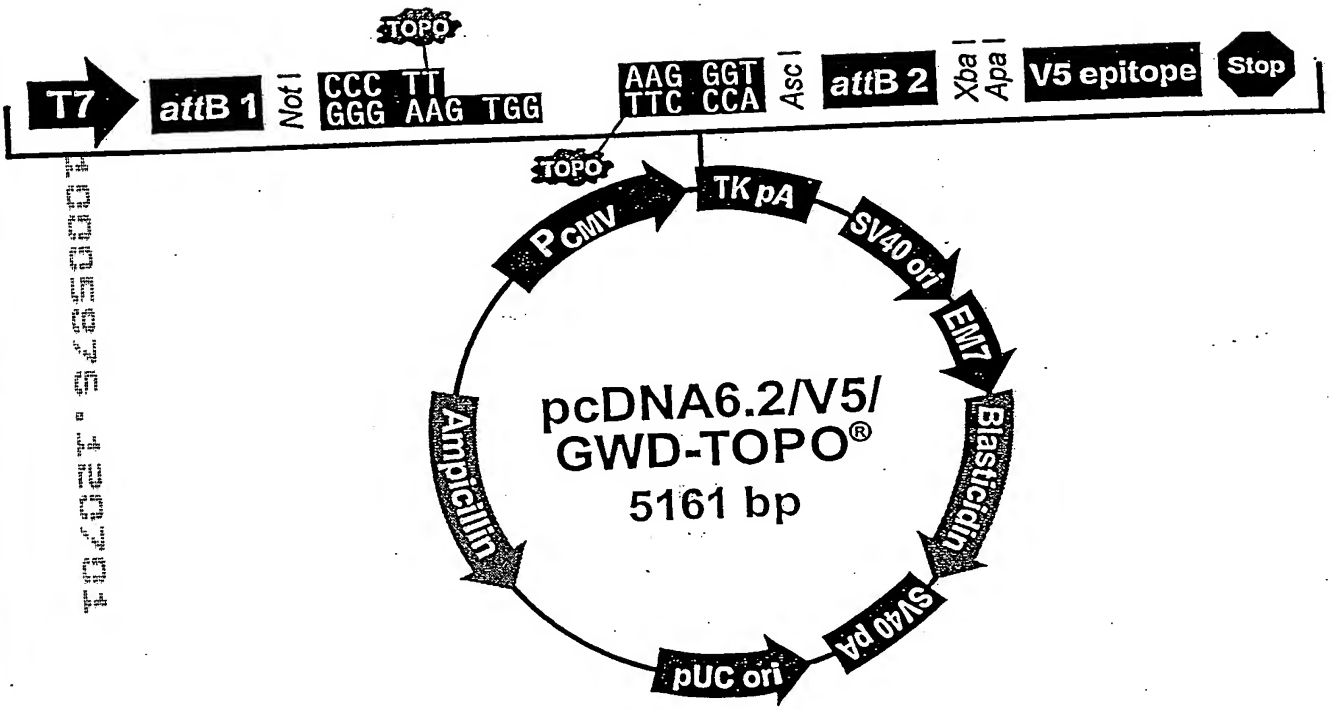
FIGURE 24C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V5 epitope
Stop
TOPO
P CMV
TK pA
SV40 ori
EM7
Blasticidin
SV40 PA
pUC ori
Ampicillin
pcDNA6.2/V5/
GWD-TOPO®
5161 bp

FIGURE 25A

```
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```

FIGURE 25B

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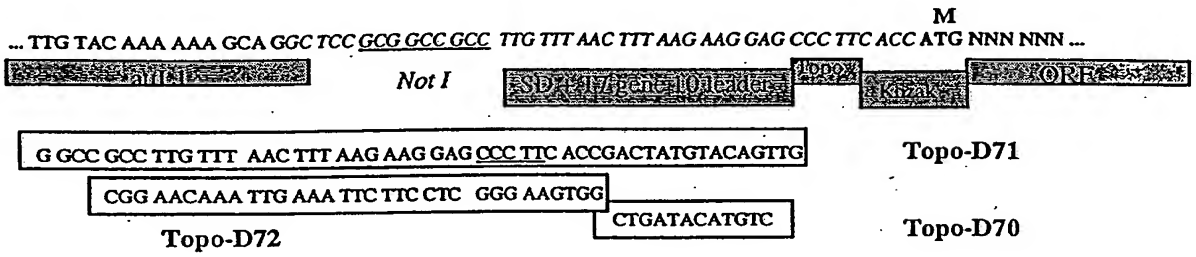
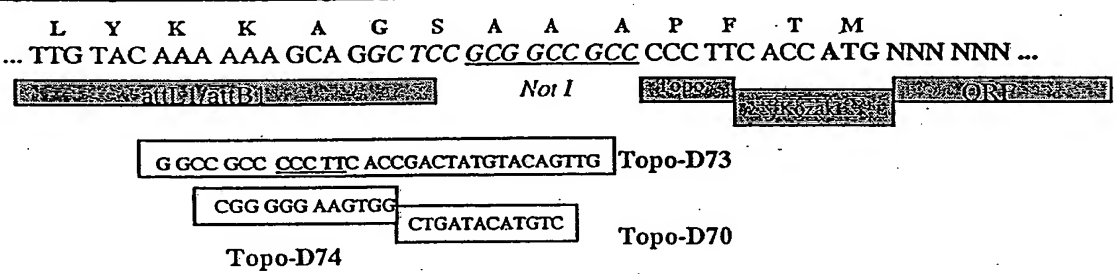
FIGURE 25C

pENTR/SD-dTopo: 5'end



ENTR-dTopo and pcDNAGW-dTopo: 5' end



ENTR/SD-dTopo, pENTR-dTopo, and pcDNAGW-dTopo: 3' end

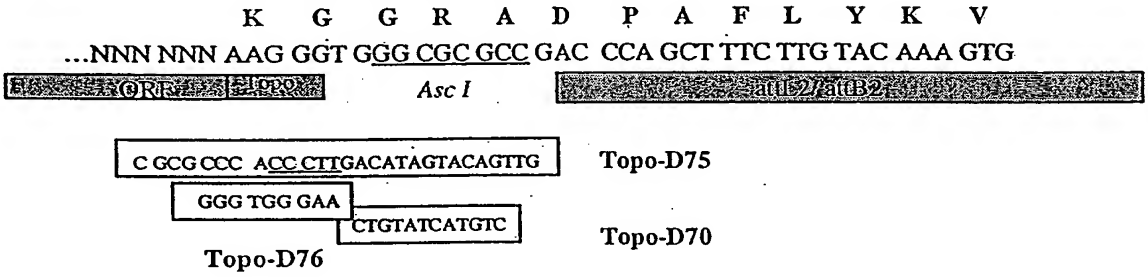


FIGURE 26

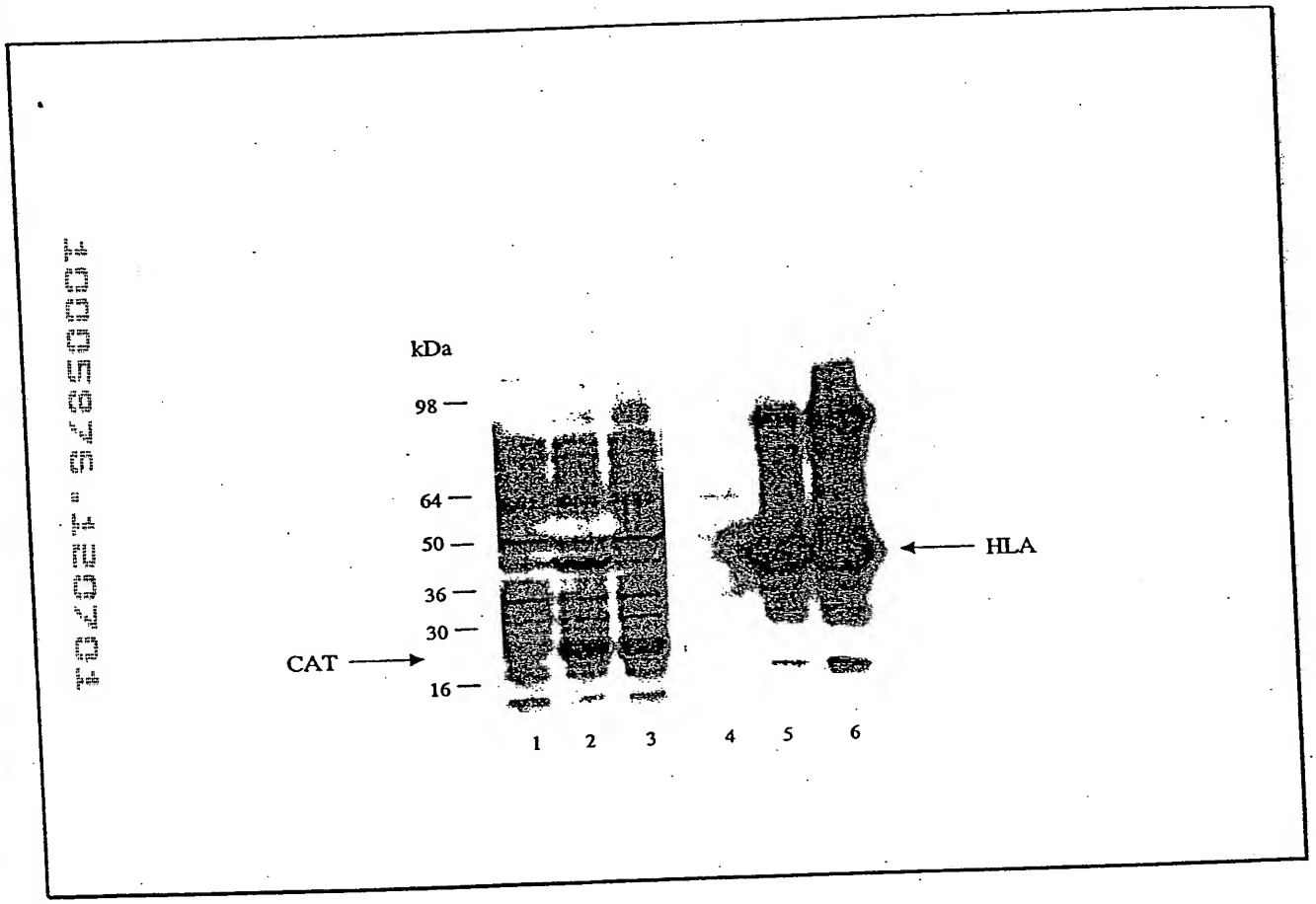


FIGURE 27

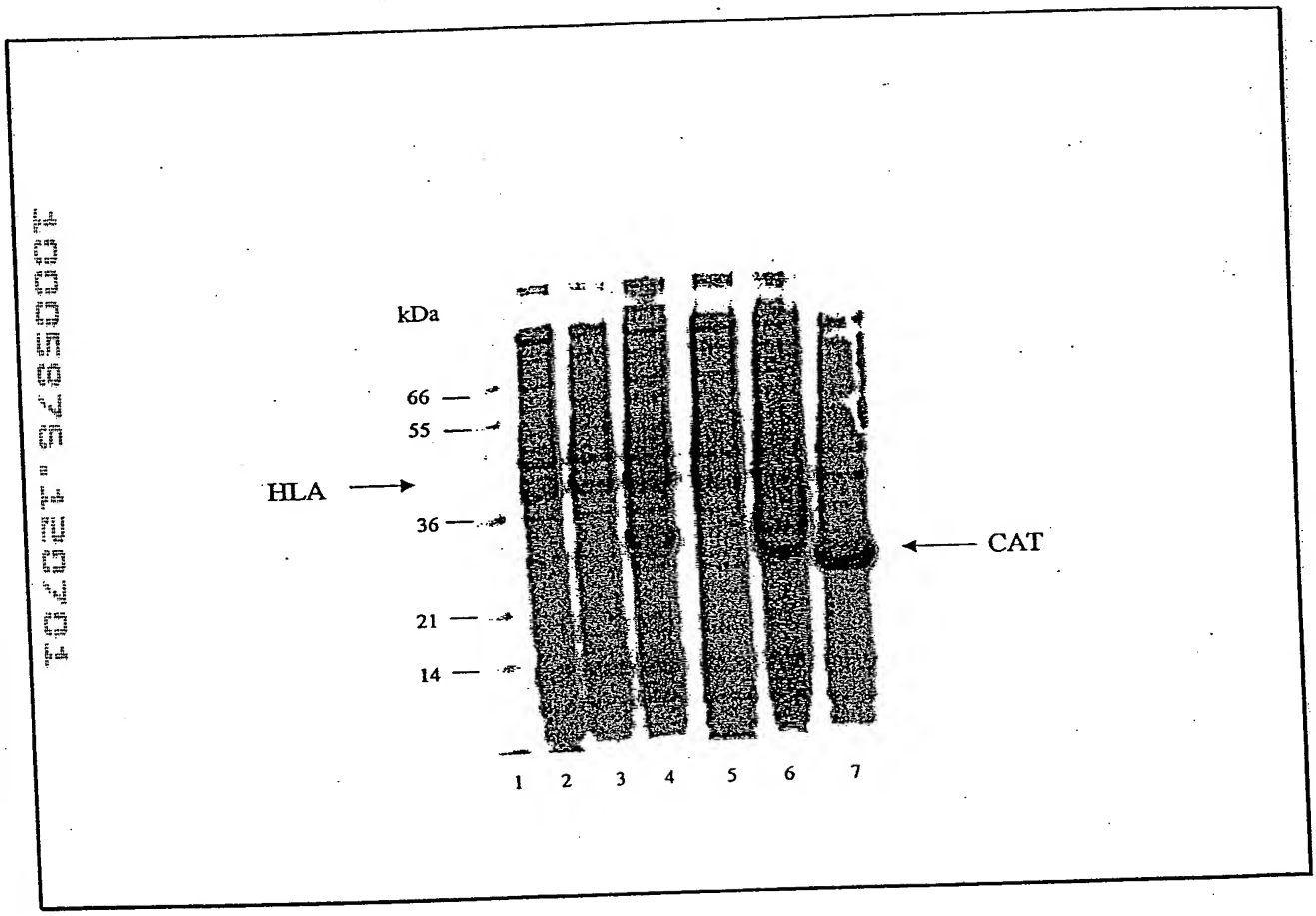


FIGURE 28

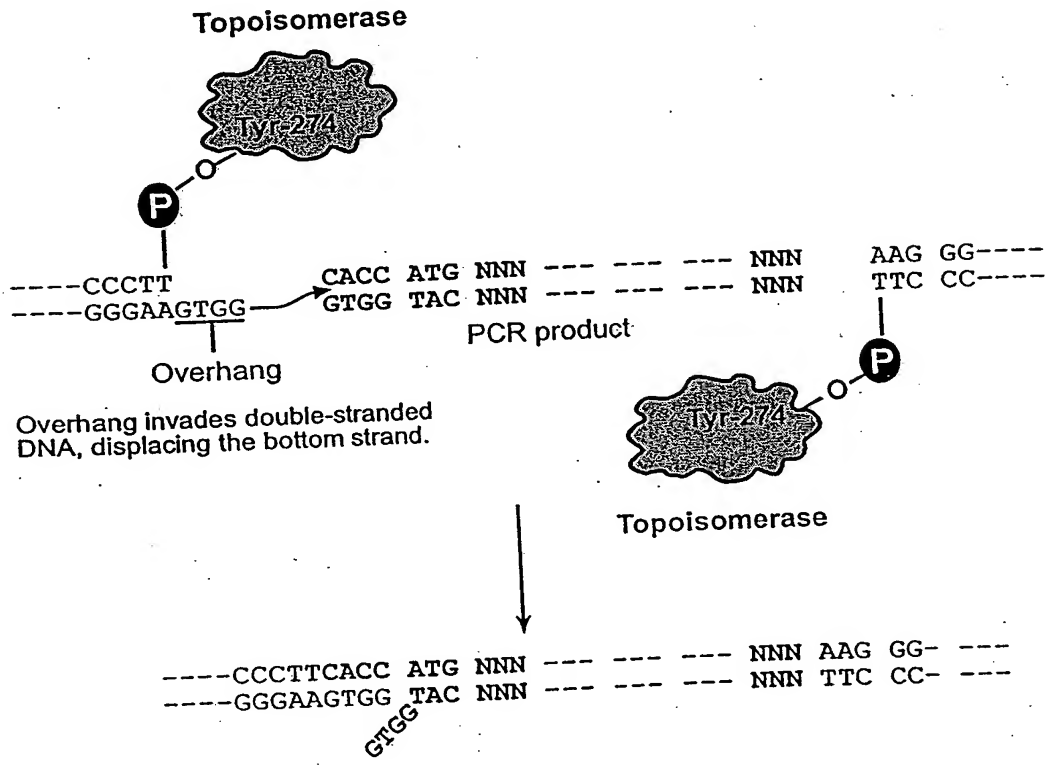
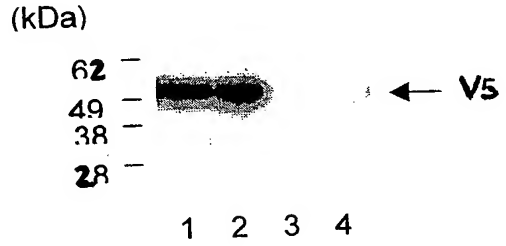
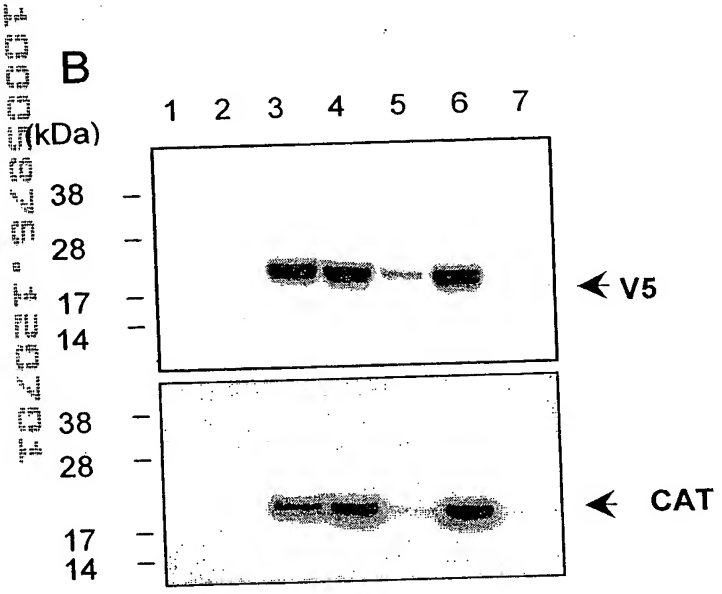

Topoisomerase
Tyr-274
P
O
----CCCTT
----GGGAAGTGG
CACC ATG NNN --- --- --- NNN
GTGG TAC NNN --- --- --- NNN
AAG GG----
TTC CC----
PCR product
Overhang
Overhang invades double-stranded DNA, displacing the bottom strand.
Tyr-274
P
O
Topoisomerase
----CCCTTCACC ATG NNN --- --- --- NNN AAG GG- ---
----GGGAAGTGG TAC NNN --- --- --- NNN TTC CC- ---
GTGG

FIGURE 29

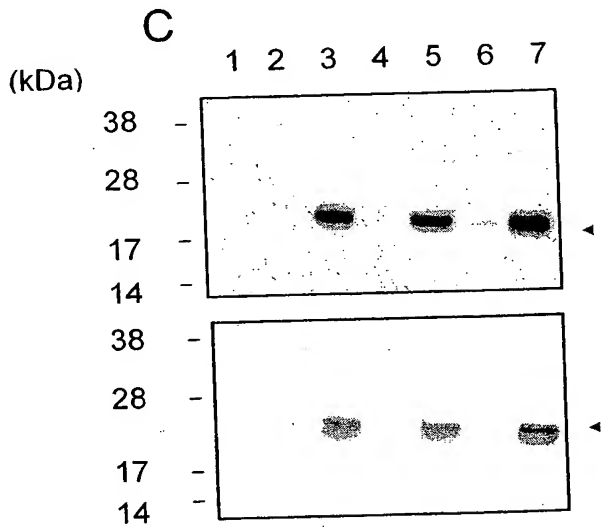
A



Lane 1: pCMVTetO/CAT/V5TKpA (without secondary PCR)+ Tet
Lane 2: pCMVTetO/CAT/V5TKpA (with secondary PCR)+ Tet
Lane 3: pCMVTetO/CAT/V5TKpA (with secondary PCR) - Tet
Lane 4: pCMVTetO/CAT/V5TKpA (without secondary PCR)– Tet

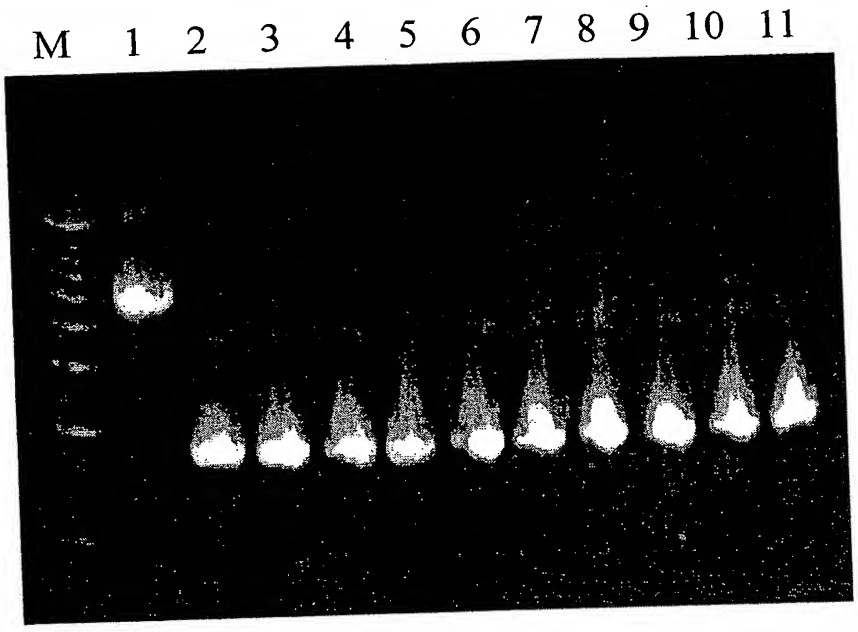


Lane 1: TRex-CHO Cells + Tet
Lane 2: without secondary PCR (with purified CAT) – Tet
Lane 3: without secondary PCR (with purified CAT)+ Tet
Lane 4: without secondary PCR (with unpurified CAT) + Tet
Lane 5: without secondary PCR (with unpurified CAT) – Tet
Lane 6: with secondary PCR + Tet
Lane 7: with secondary PCR -Tet



Lane 1: TRex-293 Cells + Tet
Lane 2: without secondary PCR (with purified CAT) – Tet
Lane 3: without secondary PCR (with purified CAT) + Tet
Lane 4: without secondary PCR (with unpurified CAT) - Tet
Lane 5: without secondary PCR (with unpurified CAT) + Tet
Lane 6: with secondary PCR - Tet
Lane 7: with secondary PCR + Tet

FIG. 30



Lane1: negative control; lanes 2-11: test clones; M: 500 bp marker

FIG. 31.

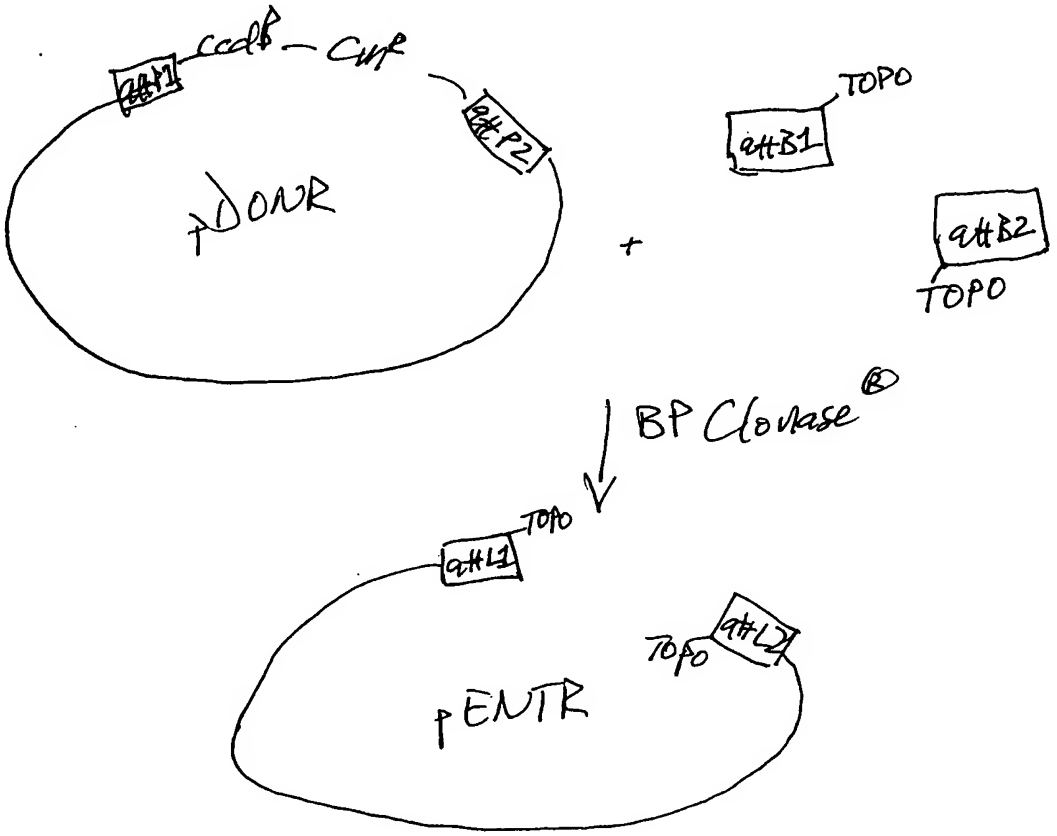

attL1
ccdB – Cm^R
attP2
pDONR
+
attB1
TOPO
attB2
TOPO
BP Clonase®
attL1
TOPO
TOPO
attL2
pENTR

FIGURE 32

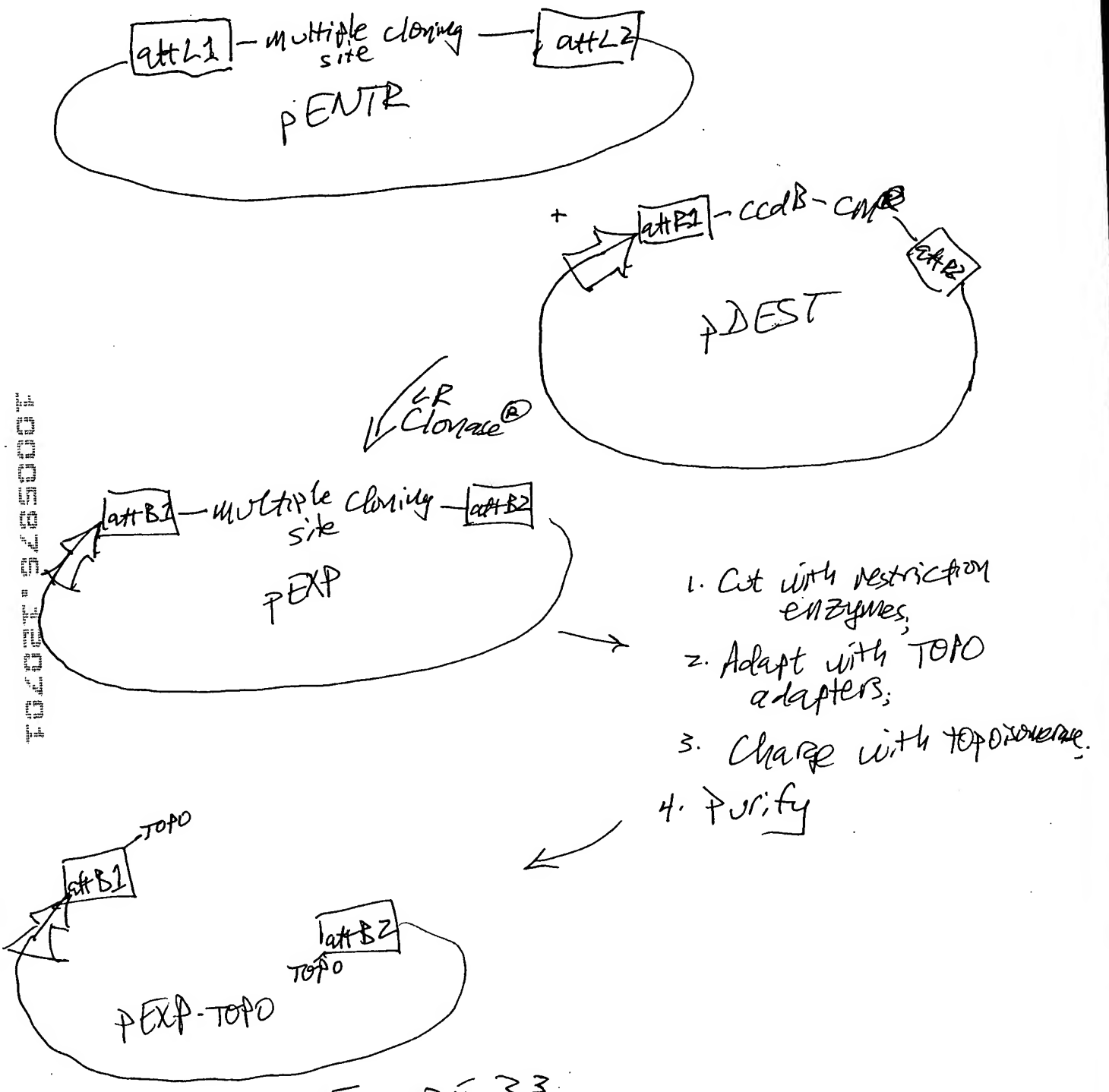

attL1
multiple cloning site
attL2
pENTR
+
attR1
ccdB
CmR
attR2
pDEST
LR Clonase®
attB1
multiple cloning site
attB2
pEXP
1. Cut with restriction enzymes;
2. Adapt with TOPO adapters;
3. Charge with TOPOisomerase.
4. Purify
TOPO
attB1
attB2
TOPO
pEXP-TOPO

FIGURE 33

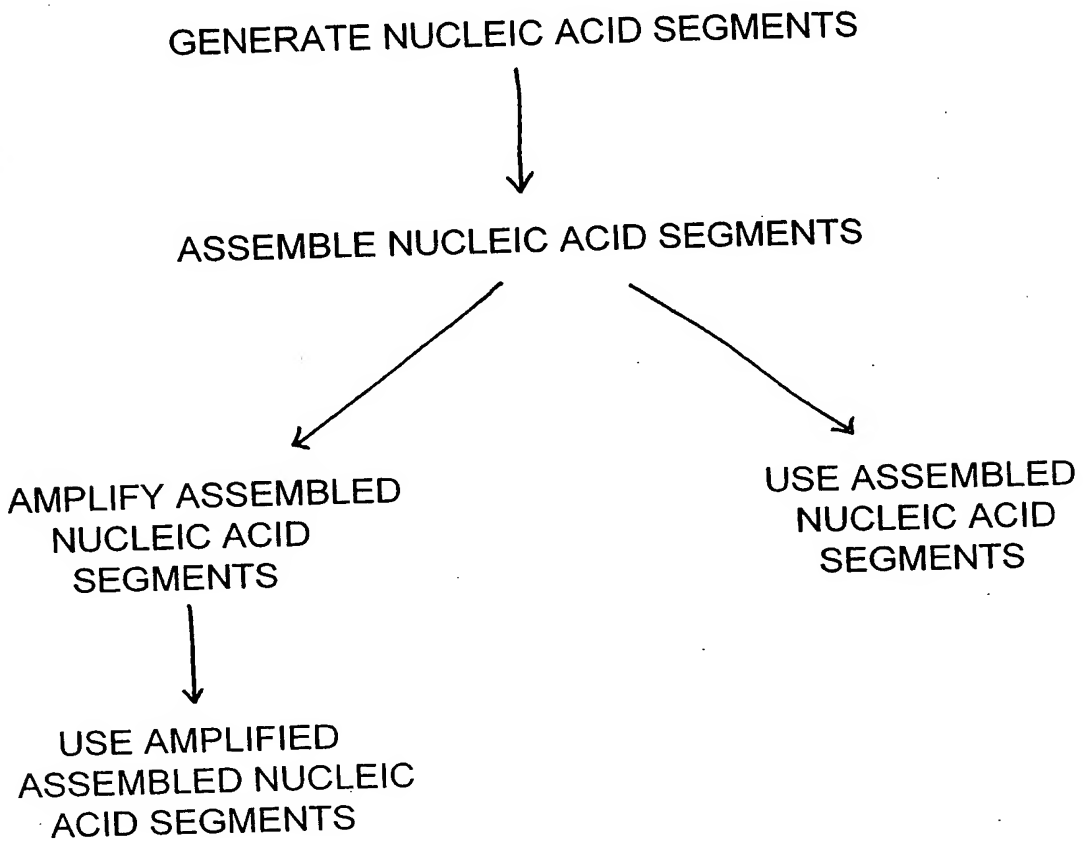

GENERATE NUCLEIC ACID SEGMENTS
ASSEMBLE NUCLEIC ACID SEGMENTS
AMPLIFY ASSEMBLED NUCLEIC ACID SEGMENTS
USE ASSEMBLED NUCLEIC ACID SEGMENTS
USE AMPLIFIED ASSEMBLED NUCLEIC ACID SEGMENTS

FIG. 34

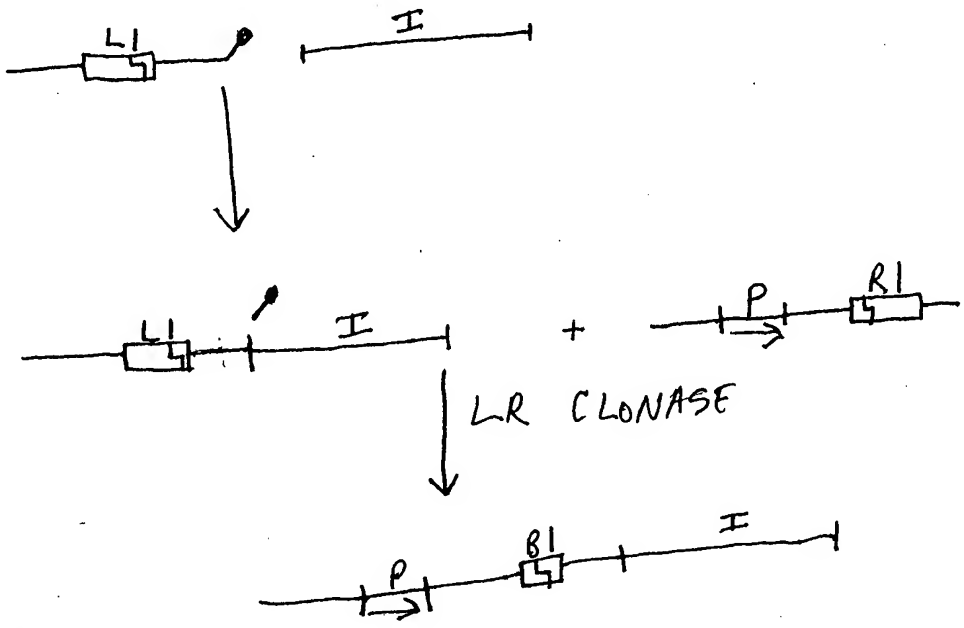


FIGURE 35

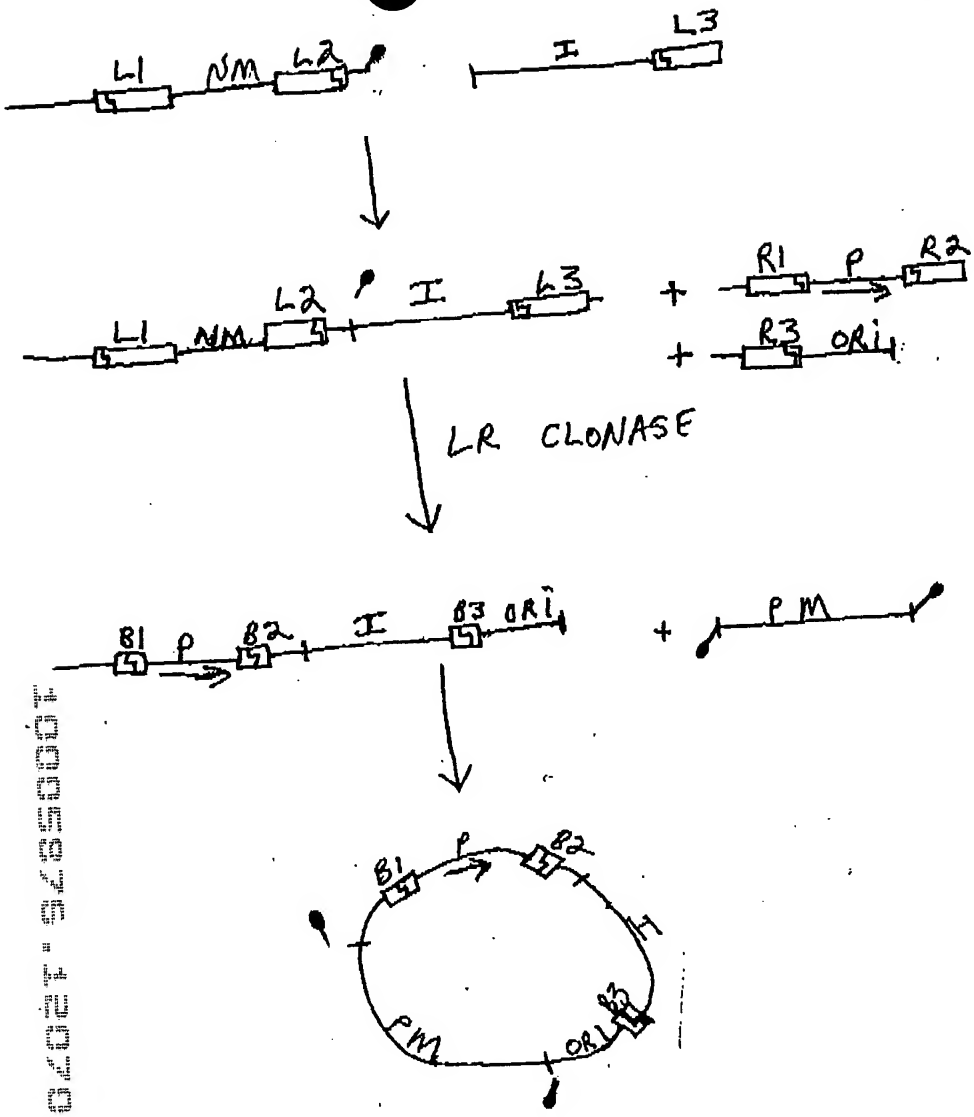

L1
NM
L2
I
L3
L2
I
L3
L1
NM
+
R1
P
R2
+
R3
ORI
LR CLONASE
B1
P
B2
I
B3
ORI
+
PM
B1
P
B2
I
B3
ORI
PM

FIGURE 36

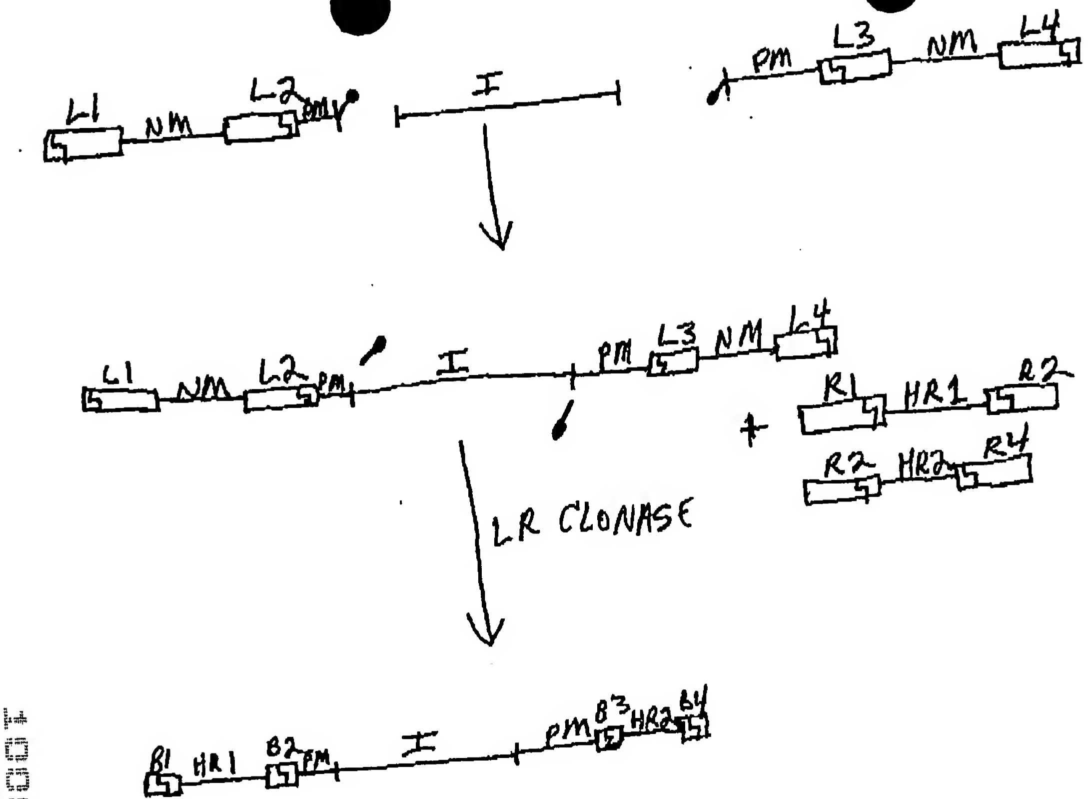


FIGURE 37

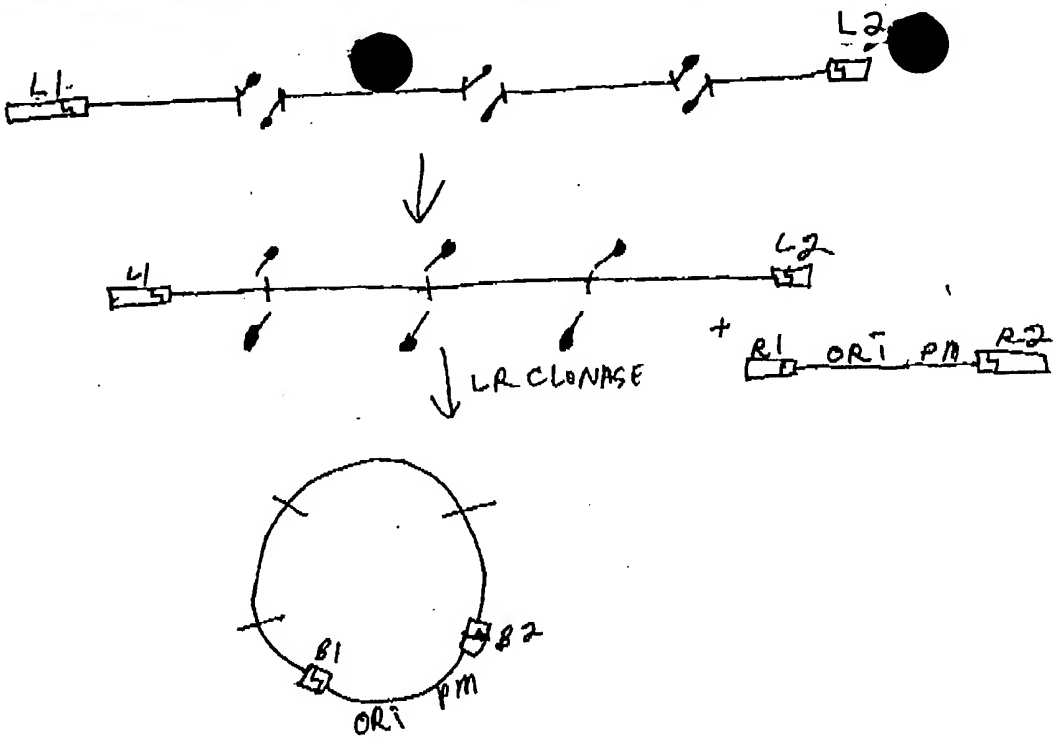


FIGURE 38

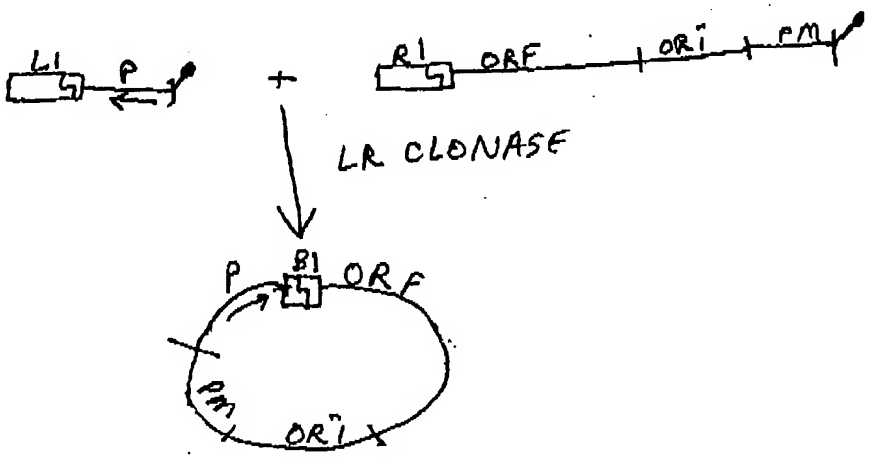


FIGURE 39

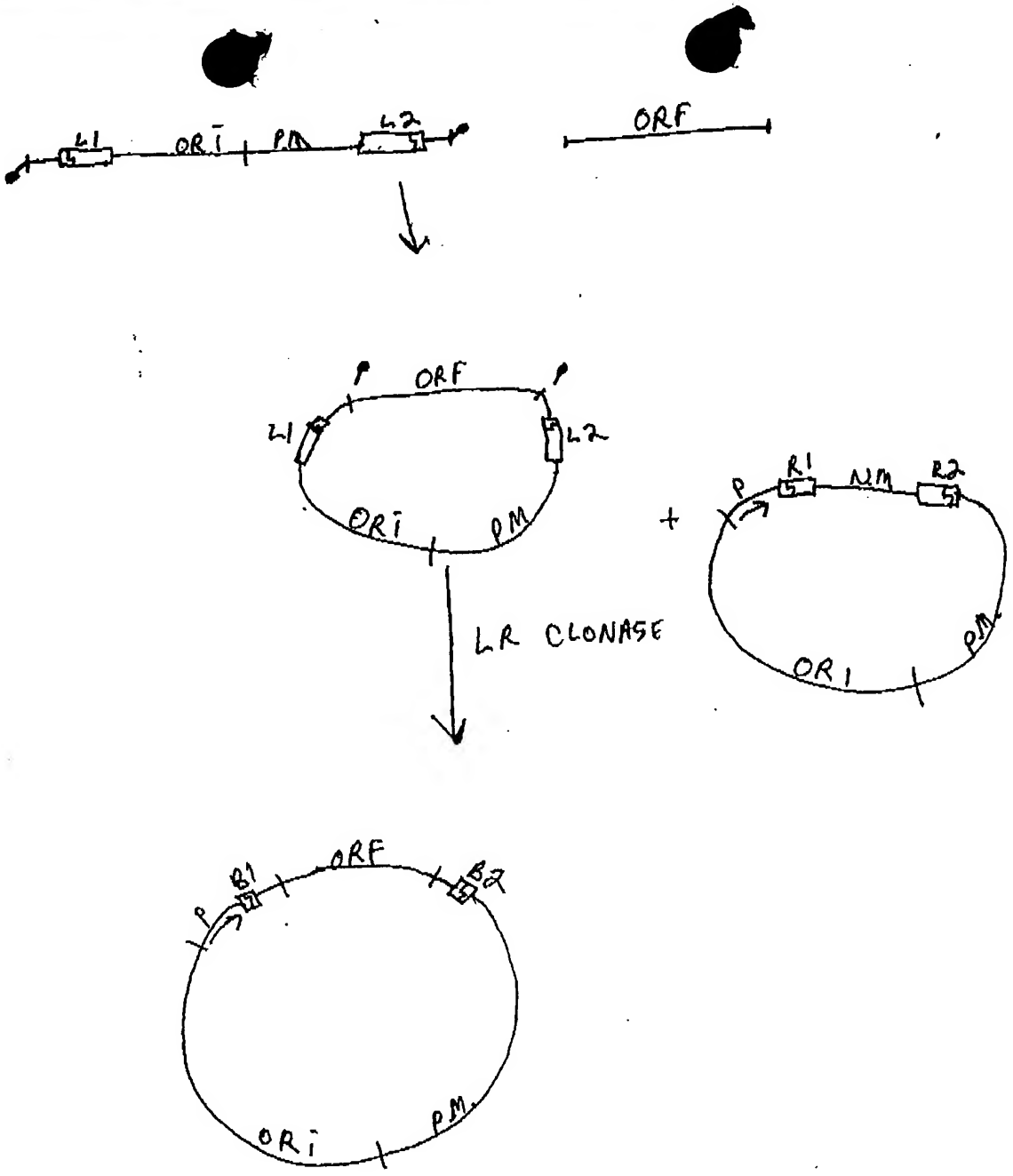

L1
ORI
PM
L2
ORF
P
ORF
L1
L2
ORI
PM
LR CLONASE
+
P
R1
NM
R2
ORI
PM
B1
ORF
B2
P
ORI
PM

FIGURE 40